AUDIO VISUAL COMMUNICATION REVIEW

Harold D. Lasswell — Communications as an Emerging Discipline

Joseph H. Kanner, Sanford Katz, William Mindak, Peter Goldsmith — Television in Army Training

Robert E. de Kieffer — AV Activities of State Departments in Teacher Education

Departments

Current Developments in Communication

Research Abstracts

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SPECIAL INVITATION

THE RESEARCH Committee of the Department of Audio-Visual Instruction extends an invitation to those who desire to present a paper at its annual meeting to be held during the national convention of the DAVI in Seattle, April 13-16, 1959. These papers should be in written form and require from 20 to 30 minutes to present. The research papers might deal with any phase of the audio-visual field including television. Persons interested in presenting such a paper should communicate with the program chairman listed below.

JOHN A. MOLDSTAD
Indiana University
Bloomington, Indiana

COMMUNICATIONS AS AN EMERGING DISCIPLINE

● HAROLD D. LASSWELL

This paper, presented at Boston University during the tenth anniversary of its School of Public Relations and Communications, presents an overview of the contributions various disciplines have made to communications theory. Harold D. Lasswell is professor of law and political science at Yale University.

NO CHANGE in the academic world has been more characteristic of the age than the discovery of communication as a field of research, teaching, and professional employment. The university system of the United States is more flexible in adapting itself to new intellectual interests than corresponding institutions abroad. Hence it is not surprising that the arts and sciences of communication have been more actively cultivated here than elsewhere.

So far as the United States is concerned, a convenient base line for comparative purposes is the appointment of an interdisciplinary committee by the Social Science Research Council in 1931, and of another committee of the same type by the Humanities Division of the Rockefeller Foundation [1] a few years later. One result of the former committee was the preparation of an annotated bibliography of the professional literature relating to public opinion, pressure groups, and propaganda. The bibliography was compiled because the members of the committee were astonished to learn how much had been published in fields unknown to them. The inference was that a bibliographic guide would perform an integrative service to all branches of science, art, and practice.

Several factors account for the fact that the lead in interdisciplinary effort in communication studies was taken at the time by political scientists. American political science was in a phase

[1] The responsibility was with David Stevens and John Marshall.

of growth at which it was casting beyond the formalities of political philosophy and public law in the hope of putting them in the perspective of the social process as a whole. Writers like A. Lawrence Lowell had drawn attention to the party system and Graham Wallas had won a following for the study of psychological factors in politics. Charles E. Merriam fostered the study of promotional activities, civic education, and political leadership; and it was Merriam who took the initiative in organizing the Social Science Research Council.[2]

One might legitimately ask why the lead was not taken by schools of journalism. After all, they were centered upon important institutions within the field of communication. The answer, I believe, is not difficult. At the time they were trade schools in outlook. Although affiliated with universities they were marginal members of the commonwealth of scholars. The early schools were intent upon winning the support of practical newspaper publishers and editors by turning out students who could get on a payroll. By putting the accent so heavily upon teaching the tricks of the trade the schools failed to perform the true function of the university in reference to any domain of enlightenment. They did not illuminate the journalistic process by providing a comprehensive factual basis for assessing the significance of this sector of the world for the goal values of society. It was out of the question for them to lead the academic world because they were barely part of it. At the time the situation was beginning to change with the emergence of new leadership (of whom I shall name but one, Professor Ralph D. Casey at the University of Minnesota). In intervening years schools of journalism have steadily expanded their intellectual scope.

The same factor helps to explain why schools of business. advertising, and merchandising did not provide interdisciplinary leadership in the university study of communication. At first graduate departments of economics kept themselves distinct from schools of business, and the departments did not fully perceive the permeating role of communication. True enough, classical market theory was built upon the postulate of equality of access to information. But there was little interest in inventing or applying tools

[2] Beardsley Ruml was the most significant figure among foundation executives in these developments. Ruml was trained as a psychologist. The Committee of the SSRC, referred to above, included the following political scientists: Harold F. Gosnell, E. Pendleton Herring, Jr., Harold D. Lasswell, Peter Odegard, Schuyler Wallace. Harwood F. Childs took the lead in establishing *The Public Opinion Quarterly* at Princeton. Bruce Lannes Smith had the laboring oar in the preparation of annotated bibliographies.

to demonstrate the degree to which this postulate held in concrete situations. More particularly, there were no empirical means of estimating the degree to which conceptions of self-interest were subject to control by communication strategies. An even more decisive point is that the typical business producer was assumed to be a "firm" whose interests were calculated in order to maximize profits. But do the policy makers of a firm actually identify with the firm? Or do they identify with family or investment groups that on occasion sacrifice the interests of a particular firm? It is the graduate schools of business who became actively concerned with the institutional realities of economic systems and who found an indispensable place in communication studies. Only recently does this appear to be having a reflex effect on the central body of economic analysis (as at Michigan).

Another professional group disqualified by academic resistance from performing a successful interdisciplinary role was made up of schools of education. Some of the most valuable techniques that have been developed for the study of communication were devised by educators who were trying to test the effectiveness of communication in the classroom. Word lists, tests of aptitude and attitude; any list would be a long one. But it was difficult to establish effective working relations with the central corps of university work in the social sciences and humanities.[3]

Three long-established professional schools might conceivably have provided the spark for modern developments: law, divinity, and medicine. So far as law is concerned, there is a rich literature that excels in practical hints on forensic rhetoric. More significant from a scientific point of view is the body of writing on jurisprudence that explores the phenomenon of collective influences upon deviational conduct. Some of the most original contributions to modern knowledge of communication came from jurists who were searching for criteria of responsibility for acts performed under conditions of panic, as in a theater fire, or of crowd excitement, as in a mob. In France, Judge (and later Professor) Gabriel Tarde, for example, became a major social scientist by the systematic way in which he placed psychological mechanisms in the center of social interaction.

But it was not by way of law schools that these influences were introduced to the contemporary scene most effectively. Until the

[3] However, Lyman Bryson of Teachers College, Columbia University, was a key figure in stimulating the Humanities Division of the Rockefeller Foundation.

"sociological jurisprudence" of Roscoe Pound at Harvard, and the appearance of "American realists" at Yale, Columbia, and Johns Hopkins, American law schools were trade schools with an outlook more closely related to the gadgetry of schools of education or journalism than to the university tradition.

Divinity schools are even more outspokenly concerned with problems of mass communication than schools of law. Ever since the Reformation and Counter Reformation put new vitality into preaching and missionary work, the training of clergymen in public speaking has been a major task of seminaries. But as with law schools, the achievements having most significance for communication studies are of a different kind. Nor am I alluding to the cookbook rules devised by copyists as a means of guaranteeing the faithful reproduction of the signs and symbols of a text. In that case we could go back to the Masoretes of first century Jerusalem.[4]

The reference is primarily to textual criticism. In fact, this was the crucible in which many of the fundamental categories and methods of modern scholarship were tempered for more general application. The study of content made it possible to challenge or corroborate the authenticity of text attributions and to restore the literary form of original versions. The biographical investigation of authors made it possible to establish linkages between the intentions and other characteristics of communicators and the purport and style of the message. The channels of communication were investigated in many dimensions ranging from the physical properties of papyrus, parchment, and paper through stylus, brush, pen, type face, and ink to the networks of copyists, printers, publishers, distributors, and libraries. Prototype researches were made into the world statistics of church attendance, conversion, and membership; and disclosures made concerning the susceptibilities of civilizations, social classes, interest groups, personality forms, and levels of crisis to the impact of channels and content of communication.

Scholarship revealed an extraordinary mixture of folklore elements with authentic historical components, and stimulated the generalization of the conceptions of myth and ideology. These were first applied to religious traditions and later passed to the study of secular systems of political, legal, and social doctrine. The comparative history of religion made it necessary to emphasize the

[4] Yule, G. Udny. *The Statistical Study of Literary Vocabulary.* Cambridge: Cambridge University Press, 1944. Chapter 1.

fundamental processes of diffusion, restriction, and fusion of rival cults and to explore the connection between esoteric secrets and exoteric disclosures. Despite all this richness the marginal position of divinity schools in the university community meant that there was little direct interdisciplinary impact during the period referred to.

At first glance it may seem surprising that I mention schools of medicine as possible sources of initiative. It is true that the bedside manner is less a matter of direct instruction than the manner of conducting one's self on the podium. But medicine has always relied upon communication as an instrument of therapy along with chemicals, knives, and braces. In the nineteenth century this became a matter of great professional and public concern with the prominence given to hypnosis, and more recently to the free associational and interpretative techniques of psychoanalysis. Like lawyers, the physicians have always been confronted by manifestations of the impact of collective interstimulation. They have seen "psychic epidemics" lay hold of whole populations with no visible evidence of organic lesions. Actually any medical advance in the therapies of communication has promptly led to a wave of generalization in the social process. We have seen studies devoted to such themes as the social influence of "suggestion," "imitation," "illusion," "delusion," "hypnosis," "the unconscious." But this strand of the medical tradition was largely missing from the curriculum of the schools of medicine 30 years ago. Even dynamic psychotherapy was better entrenched outside than inside the medical schools.

What of the disciplines traditionally regarded as the humanities? Here at least we are at the heart of the university tradition. One might expect interdisciplinary leadership in the study of communication to come from linguistics. After all, language is the most distinctive of all channels of communication. Furthermore, philologists were among the first to demonstrate uniformities that rivalled many of the generalizations of the physical sciences. In fact, however, these scholars did not take the lead. It appears that early success had led to the restriction of scope to comparative syntactics. By this expression I am referring to comparative grammar and the basic sounds—phonemes—of language. And it is in vocabulary changes, not in syntactics, that the greatest flexibility is to be expected. In this area it is still a little *infra dig* for good specialists to concern themselves with vocabulary.

The role of scholars in the study of literature resembles the linguists. They, too, occupy a central position in the communication processes of society. Further, in view of the enormous scope of literary researches, and the vast army of talent in this field, it seems probable that *some* scholar, at least, will pursue almost any idea. It can be shown that practically all data-gathering devices have been pioneered by someone professionally devoted to literary studies. We know of the most minute studies of the motives, aptitudes, and formative influences affecting the "who" of the communication paradigm: *"Who* says *what* in which *channel* to *whom* with what *effect?"* Not only the individual "who," but the communicators of an epoch considered as a whole, have been combed through. Exceedingly detailed researches have been done upon vocabulary (word origins, length, frequency, distribution), sentence structure (length, grammatical arrangement, rhythm), and context (paragraphs, larger units). Investigators have concentrated upon the characteristic productions transmitted through a given medium and mode (novels, plays, poems, autobiographies); they have established the facts of circulation and readership; they have sought evidence of impact on all the value-institutional processes of society. Professional scholars in the literary field have found themselves making contributions to cryptography, to the detection of false legal documents, and to many other communication problems beyond the limit of their ordinary preoccupation.

The record shows that the interdisciplinary zeal with which communication studies were taken up in our time owes a great deal to I. A. Richards, the critic, and C. K. Ogden, the psychologist, and *The Meaning of Meaning.* The critics, as indicated before, have gone in many directions, not excluding the quantitative (as in Caroline Spurgeon's summary of Shakespeare's imagery).[5]

Nonetheless, the fact remains: The most successful statements generalizing the process of communication did not come from the scholars of literature. In their case two sharply contrasting methods dominate the field. On the one hand, there are patient, disciplined, even quantitative, studies of particular phenomena. On the other, the content is highly allusive and impressionistic. The middle range of theory construction so frequent in the social

[5] Note that it was the Humanities Division of the Rockefeller Foundation that had the vision to foster communication studies. Douglas Waples made the Graduate Library School at the University of Chicago an important center. Waples' fields were literature and education. Concerning modern criticism see especially Hyman, Stanley Edgar. *The Armed Vision, A Study in the Methods of Modern Literary Criticism.* New York: Alfred A. Knopf, 1948.

sciences has had little currency and may have operated to restrict the influence of the scholars of literature.

It is not absurd to suppose that the prototypes of interdisciplinary work might have been furnished by those branches of the humanities that dealt with nonverbal forms of expression: music, the plastic and pictorial arts, architecture. Words about nonwords, one may suggest, are somewhat more "objective" than words about words. This can be true for much the same reason that an anthropologist finds it easier to be objective in talking about a primitive chief than the current occupant of the White House. However, the United States was not rich 30 years ago in distinguished scholars of the arts. It is not without significance that Richards (and Ogden) were English, which was rich in literary critics, though rather impoverished in art scholarship when compared with Germany or Italy, for example.

Traditionally the historians have been bracketed with humanistic studies, and the compendious scope of the subject matter, together with the abundance of personnel, might suggest that the most comprehensive view of communication would come from historians. Beyond question they have done much to develop the categories of which systematic communication theories are compact restatements. Most of these conceptions were evolved as part of the great counterattack engineered by historians and the romantics generally against planned, revolutionary, and drastic social change—in a word, against the French Revolution. The most vexing problem was: If the life of a people cannot be made subject to abiding change by revolution, why do revolutions occur at all? All sorts of conceptions were invented or adapted as inquiry proceeded. I mention a few: "public clamor," "public sentiment," "public opinion," "crowd sentiment," "cosmic perspective," "spirit of the age." Some historians gave concentrated attention to these factors, especially after the rise of the Marxist challenge.

Of all the humanistic studies philosophy is the one with the historic claim to a central position. And it can be shown that philosophers had a great deal to do with the categories and approaches that were taken up when communication theory began to come into its own. American philosophers did in fact foster the growth of academic preoccupation with the analysis of informed public opinion. Recall, in this connection, John Dewey's *Public and Its Problems*. Several philosophers, among whom George H. Mead

was notable, were pivotal figures in social psychology, then in a state of parturition from adjacent specialties, such as psychology, social science, and history. The immediate impress of philosophers was limited by the circumstance that they were not much interested in protracted empirical researches. It is typical of the "mother matrix" function of philosophy that when anyone became intensely absorbed in the study of collective behavior, as did Robert E. Park, for example, the scholar removed himself from philosophy and migrated to sociology, for instance.

The contributions of philosophy to communication theory are becoming more rather than less profound as specialists in the rapidly growing discipline of communications studies become more capable of passing to and fro between theory and observation. The postulational logics, for example, have already affected the study of legal language; but the deepest effect, in close conjunction with mathematics, has been upon the design of computing machines, or "artificial brains." The roots go back at least to Charles S. Pierce and run through A. N. Whitehead and Bertrand Russell, Rudolf Carnap, and other logical positivists, to J. C. C. McKinsey and his colleagues.

The mansions of philosophy also include an armory of devices for exploring the more subtle nuances of communication; their potential, indeed, has not yet been tapped. I refer to the comprehensive orientation of Ernst Cassirer, for instance, and of such creative devotees as Susanne Langer in aesthetics.

Since the orientation of academic departments of psychology was not toward the analysis of collective behavior, they did occupy a vanguard position in communication research.

I have been suggesting some of the factors relating to the intellectual division of labor 30 years ago that are of help in explaining why political science, in particular, happened to play an important part at a certain time in the promotion of interdisciplinary research in communication. Since that time the initiative has moved elsewhere, although professional students of government and law continue to devote more and more attention to communication. By far the largest body of work of immediate significance has been done by scholars whose major conventional identification is with sociology, social psychology, and to a lesser extent, social anthropology.[6] The last few years have witnessed a great expansion of

[6] Among those in the early committees—and I cite them to represent disciplines, not for completeness—were Paul Lazarsfeld, sociologist; Hadley Cantril, psychologist; Hans Speier, sociologist.

numbers and influence, and this has been closely connected with the emphasis that has been put upon statistical and mathematical training, and upon research in the field or in the laboratory. In effect, an heroic attempt has been made to fashion an army of well-trained and properly equipped soldiers to fill in the chasm between the General Staff plans of the older theoreticians and the empirical battlefront. It is not my purpose to apportion individual or university accolades in this evolution. But it is no secret to anybody who is acquainted with the facts that a role of peculiar importance has been played by Professor Paul F. Lazarsfeld and the Bureau of Social Research at Columbia. The formation of social science research councils on various university campuses was begun in the 1920's. The formation of research bureaus, as at Columbia and Ann Arbor, specialized to the study of communication, has given a decisive impetus to the growth of what may one day become a world inclusive network of social self-observatories.

During recent years another great impetus has been given to the cross-disciplinary study of communication, this time from a relatively new quarter, namely, from engineers and neurologists who exploited their ties with mathematics and physics. I refer, of course, to the developments associated with Claude E. Shannon and Norbert Weiner and their circles.[7]

It is quite impossible for an alert mind to allow his attention to sweep across this remarkable growth of concern for communication without searching for explanations and without projecting the future in some degree.[8] My assignment here does not include either responsibility in detail. Let me nevertheless offer one remark about the physiognomy of the emerging university. Every center and subcenter within the university community will contain at least some scholars who are sensitized to the significance of what is being done at that particular center for the understanding of life processes. All *interaction* among living forms is a complex and variable process of *collaboration* and *communication.* Hence all the value outcomes sought through the diversified institutional forms of society are specialized in various degree to communicating and collaborating. Economic outcomes subordinate commu-

[7] Put in perspective by Miller, G. A. *Language and Communication.* New York: McGraw-Hill Book Co., 1951; Cherry, Colin. *On Human Communication: A Review, a Survey, and a Criticism.* New York: The Technology Press of Massachusetts Institute of Technology and John Wiley & Sons, 1957.

[8] Consult Berelson, Bernard. "The Study of Public Opinion." *The State of the Social Sciences.* (Edited by L. D. White.) Chicago: University of Chicago Press, 1956, for a thoughtful review of the urge toward a more satisfactory balance between theory and data in these studies.

nication to wealth; political outcomes subordinate communication to power; and so on through the value outcomes. Only one of the value-institution processes is distinctly preoccupied with an outcome that culminates to an exceptional degree in the exchange of communications. We refer in this connection to the institutions of individual and collective *enlightenment*. It is appropriate that the part of the university community distinctly concerned with enlightenment should become a focal center of study and inspiration to studies that continue to open up the new world of communication knowledge.

TELEVISION IN ARMY TRAINING:

Evaluation of Television for "Intensive" Training and for Reducing Instructor and Student Training Time and Costs

- JOSEPH H. KANNER
- WILLIAM MINDAK
- SANFORD KATZ
- PETER GOLDSMITH

Over a period of several years this journal has published reports of the important television research being conducted by the Army Pictorial Service Division under Dr. Kanner's direction. This paper contains two additional reports, each presenting evidence on problems investigated in earlier exploratory studies. Joseph H. Kanner is chief, Audio-Visual Applications Office, Army Pictorial Service Division; Sanford Katz is instructor in psychology, Williams College, Massachusetts; William Mindak is assistant professor, School of Journalism, University of Minnesota; and Peter Goldsmith is associated with the Clay-Adams Corporation, New York.

IN 1955, A LONG-RANGE program of television research was established by the U. S. Army Signal Corps. The objectives of this program have been previously described (21). The two studies reported in this paper were designed to cut across many of these objectives, and were carried out as a continuous activity from January to August 1956.

STUDY I

Background

The equivalence in teaching effectiveness between television and conventional instruction for a variety of subject matter has been repeatedly demonstrated (1, 2, 10, 15, 18, 19). These findings are generally based on television instruction limited to one or two hours a day over a period of time. Television, in general, has also been used for teaching in the following manner: A television facility may broadcast for six to eight hours a day, but in this period as many different subjects may be covered. This use con-

trasts, for example, with many types of military training, in which instruction in a particular subject matter extends over an entire day for many weeks or months. Were it possible to use television for such extensive periods of instruction, its value for everyday and emergency uses would be increased. One reason television is not used for more extended periods of instruction is the belief that such intensive viewing would bring on fatigue or similar effects which might impair learning.

Another objective of this study was to investigate the use of "minimal" television production techniques. These techniques refer to the use of television with a minimum of preparation or efforts to adapt teaching material to television. It involves the procedure of taking an experienced classroom instructor and having him teach over television with little or no rehearsal or preparation.

Purpose

It was the purpose of this study to compare the effect upon learning produced by 38 hours of continuous television training over a five-day period, with that produced by a similar period of regular classroom instruction. A secondary objective was to evaluate the teaching effectiveness of minimal television presentations.

Subject Matter

The first week of the Power Maintenance Course at the Signal School, Fort Gordon, Georgia, was selected for use in the study. The purpose of this course is to train selected enlisted personnel to install, operate, and perform organizational maintenance of portable electric-power generating equipment. Essential to their performance is a knowledge of the fundamentals of electricity as related to their jobs.

The first week of the course is chiefly concerned with the principles of electricity and covers such subjects as first aid, electricity, magnetism, test equipment, Ohm's Law, parallel and series circuits, the reading of diagrams, grounds, electro-magnetism, induction, transformers, storage batteries, the RA-91 rectifier, the charging of storage batteries, and maintenance records. The instruction, as normally presented, includes lectures in which the student participates by asking and answering questions, a number of training films, and practical exercises in which the student has an oppor-

tunity to apply what has been learned in the lectures. This portion of the course is very typical of a variety of electronics courses and training given in the Army.

Trainees

The trainees were 281 enlisted men assigned to the Power Maintenance Course at the Southeastern Signal School, Fort Gordon, Georgia. Information such as the aptitude test scores of the trainees was supplied by the school's Record Branch. Trainees were not informed of the fact that they were participating in an experiment. However, Fort Gordon has been using television for training for about five years, and television instruction is not considered a novel method of teaching.

General Design

Trainees entering the first week of the Power Maintenance Course received instruction exclusively by television or by regular classroom methods. Table 1 indicates the rotation of television and regular instruction used in this study.

TABLE 1.—ALTERNATION OF TELEVISION AND REGULAR INSTRUCTION METHODS *

Week	*Method*	*Week*	*Method*
1st	Regular	5th	TV
2nd	TV	6th	TV
3rd	TV	7th	Regular
4th	Regular	8th	Regular

* It was originally planned to have an ABBAABBA order to control for possible systematic week-to-week variations, but, due to reasons beyond the experimenters' control, the order had to be changed.

The instruction was the same for all classes. It was divided into 10 sessions, 5 morning and 5 afternoon periods, with tests administered at the end of the morning and afternoon sessions to measure immediate learning. A retention test was administered about one month after the end of the first week of instruction.

This design permits a comparison of the teaching effectiveness of television and regular classroom instruction after various amounts of viewing time. It is most likely that trainee learning

decreases as the amount of instruction increases in both television and regular classroom instruction. The purpose of this study is to determine whether the *rate* of decline *differs* for the two teaching procedures. For example, is learning more impaired by intensive television instruction as compared with intensive regular classroom instruction? Trainee performance on the 10 tests used would provide evidence on this question. Such evidence would be in the form of a systematic change in test scores favoring one method over the other.

Figure I indicates a few of the many possible outcomes of the study. Graph (a) exemplifies a hypothetical outcome indicating that increased viewing time increases the differences between media (shaded area). Graph (b) exemplifies an outcome indicating that increased viewing time decreases differences between media (shaded area). Graph (c) exemplifies an outcome indicating that the differences between media are not noticeably affected by increased viewing time.

It must be stated at the outset that the design is not very sensitive to small differences in losses in teaching effectiveness. This fact does not decrease the value of the experiment to any great extent, since a small change in differential teaching effectiveness would not be of any great consequence. Conversely, any increase in the sensitivity of the experiment would have required an extremely large increase in costs and man-hours.

PREPARATION OF TESTS AND INSTRUCTION

Immediate Testing

Evaluation was based on the results of written tests given to the trainees immediately after instruction. Since it is not general Army procedure to give immediate tests, a series of 10 tests were developed specifically for the study, containing a total of 296 items. The items were 4-alternative multiple choice and were constructed with a view to making them easily understood and unambiguous. An attempt was made to have items of varying difficulty with the average difficulty being high enough above chance to avoid *floor effects*[1] and low enough to avoid the *ceiling effect*.[1] Whenever possible, items employing pictures or diagrams were used. The 10

[1] Differences between groups are minimized or eliminated when test items are so difficult that few trainees are able to answer them correctly (the floor effect), or so easy that most trainees are able to answer them correctly (the ceiling effect).

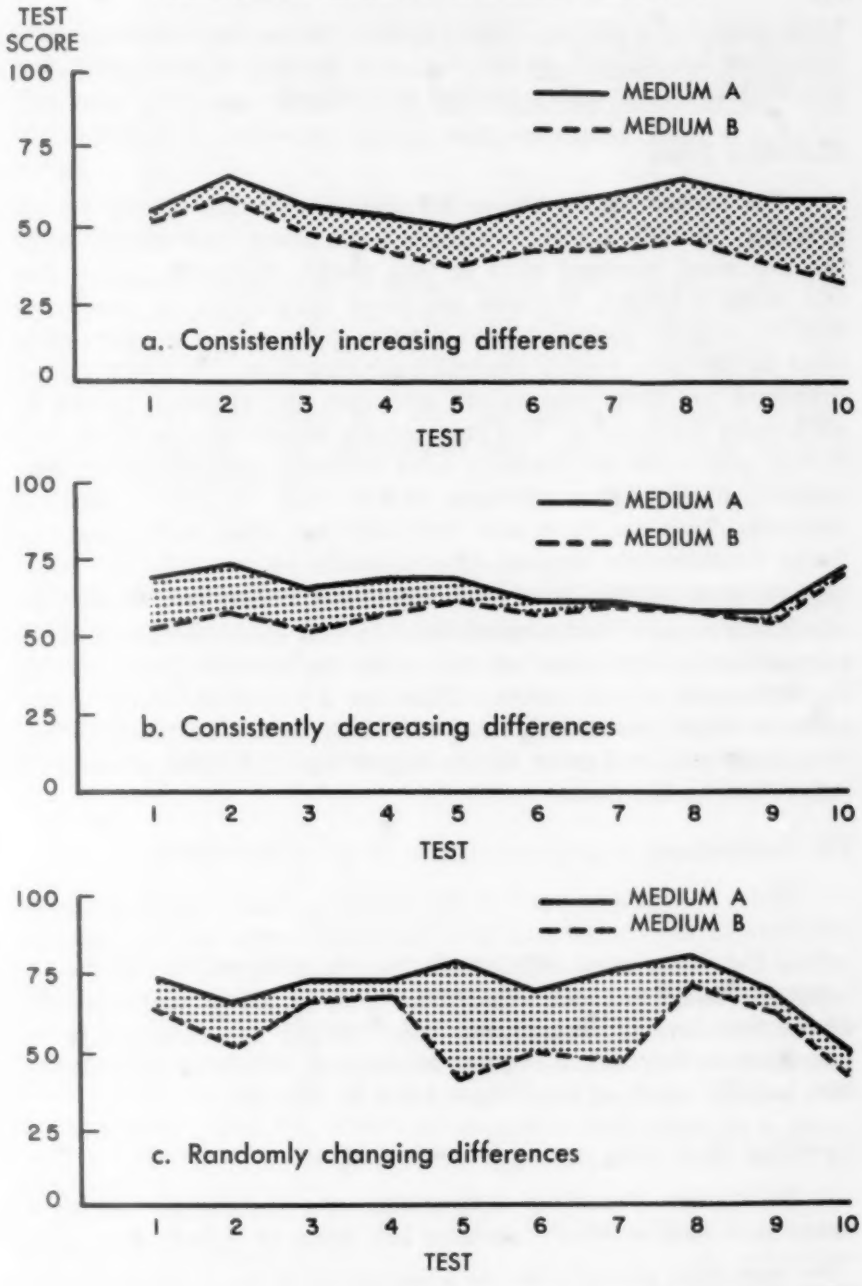

Figure I

Hypothetical results indicating possible outcomes of the study

tests were tried out on three regular instruction classes. Items that were too difficult or too easy and items that were poor discriminators [2] were either revised or dropped.

Retention Tests

The format of the Power Maintenance Course offered an opportunity to administer retention tests about one month after the one week segment used in this study. Normally, after this one week is taught, trainees are given instruction in diesel and gasoline engine operation and similar materials generally unrelated to the first week's electronics instruction. This instruction continues for about one month and then the students return to electronics instruction. The instructors, therefore, are more concerned with what the students have retained from the electronics instruction given the previous month than in any immediate learning. This condition also approximates other Army instructional requirements because several weeks or months may intervene between completion of formal training and on-the-job activity.

The retention test administered in this study consisted of 70 representative test items selected from the 10 tests given during the first week of instruction. This test was administered to the trainees about one month after the first week's instruction had been completed and prior to the beginning of further electronics instruction in the course.

The Instructors

Four instructors divided the teaching load. All four were members of the course staff and had taught some of the material before the experiment. The work load was divided so that each instructor taught at least one but no more than two hours on each of the five days of instruction. They taught the same hours on television as they did in regular instruction. None of the instructors had TV teaching experience prior to this study.

Teaching Materials

In regular classroom instruction, the instructor follows a lesson plan outline which indicates key items of information to be

[2] The discriminative power of a test item is determined by dividing the trainees into two groups on the basis of score on the test as a whole: high scorers (above the 50th percentile) and low scorers (below the 50th percentile). Any test item which is answered correctly by about as many low scorers as high scorers is considered to have poor discriminative powers.

covered. This procedure permits wide variations in the instructor's presentation although he may cover the lesson plan objectives. The same procedure was used in the television presentations, with the instructors following lesson outlines rather than a detailed script.

Training Aids

The same training aids were used in both the television and regular instruction with the exception that, wherever possible, actual equipment was used in the television presentations. The training films employed were presented by projector and screen in the regular instruction and over the television receiver in television instruction. The blackboard was used frequently in both methods of instruction.

Rehearsals

Each hour was rehearsed at least once, with attention being paid to movements in front of the cameras, writing on the blackboard, the handling of training aids in front of the cameras, and other details required for a television presentation. The television directors were given copies of the lesson plans in which they made notes as to the presentation, and which served as their guide.

DESCRIPTION OF EXPERIMENTAL PROCEDURE

Training Site

Both television and regular instruction were presented in the classrooms normally used for instruction in the Power Maintenance Course. For television instruction, two 21″ receivers were used in the classroom. In regular instruction, the instructor spoke from a rostrum in front of the class. The size of the classes was never greater than 45. Practical exercises took place in a room with a number of tables on which the equipment used could be laid out.

Regular Instruction

Normal teaching procedures were followed in regular instruction. An attempt, not always successful, was made to eliminate

questions and answers so as to achieve comparability with the television presentations.

Television Instruction

The staff used in the TV production included a program director, a technical director, an audio man, two cameramen, and a prop man. Two image-orthicon cameras were used for each presentation, with lenses varying in focal length from 2″ to 8″. Two studios were employed in a single alternation series in order that each studio could be set up for the following presentation. The presentation was transmitted over a closed circuit by coaxial cable. No intercommunication system was used between the classroom and instructor, so that the class could not ask or answer questions. Little or no attempt was made to adapt the regular instruction to television requirements. Special effects, superimposures, close-ups, and similar techniques were eliminated or employed minimally. The instructor appeared before the cameras and gave his presentation from an outline in the same manner as in the regular classroom instruction.

Visual Aids

Due to the theoretical nature of much of the material covered, relatively few visual aids were employed. The aids that were employed included some test equipment, the RA-91 rectifier, maintenance record forms, transformer demonstration equipment, and a few others. The blackboard was used frequently. A demonstration of artificial respiration techniques was presented. In general, it could be stated that the production for the major part was of the lecture variety with some demonstrations of structure and function of equipment.

Auditing of Instruction

Both the regular and TV instruction were monitored in order to determine what actually went on in the classroom and to see if the material was covered. The monitor sat in the classroom with a check list based on the lesson plans. He used the check list to indicate whether or not the material was actually covered. Proctors were provided by the Test and Evaluation Branch.

ANALYSIS OF RESULTS

Post Selection and Post Matching of Trainees

Only trainees completing all 10 tests were considered in the analysis of results. In order to eliminate initial differences in aptitude, a post-matching procedure was employed based upon trainees' aptitude test scores. Each trainee from the regular classroom group was paired with a trainee from the TV group who had an equivalent aptitude test score. The number of trainee pairs employed in the analysis was 62 for immediate testing and 50 for retention testing.

RESULTS

Immediate Testing

Table 2 presents the mean scores for and differences between TV and regular instruction on the 10 tests, singly and combined (total score). These results indicate that regular instruction was slightly but consistently superior to TV instruction.

The sample was further divided into two aptitude level groups, with the top 31 pairs being treated as the high-aptitude level group and the bottom 31 pairs being treated as the low-aptitude level

TABLE 2.—MEAN RAW SCORES FOR THE 10 TESTS

Test	*No. of Items*	*Regular Instruction Mean*	*TV Instruction Mean*	*Diff.*
1	37	23.3	21.2	2.1*
2	19	9.5	8.3	1.2*
3	38	22.1	19.6	2.5*
4	23	8.3	7.8	.5–
5	36	17.5	16.6	.9–
6	20	11.3	10.5	.8–
7	37	22.3	20.5	1.8*
8	23	10.8	10.0	.8–
9	38	22.3	19.2	3.1*
10	25	17.4	14.6	2.8*
TOTAL SCORE	296	164.7	148.5	16.2*

* Significant at the 5% level of confidence.

group. Table 3 includes the mean raw scores for the various combinations of aptitude media groups on the various tests. Table 4 includes the same results as percentages of the number of items included in the various tests.

The high-level aptitude group was consistently superior to the low-level aptitude group regardless of method of teaching. This indicates that aptitude was the more critical variable in determin-

TABLE 3.—MEAN RAW SCORES FOR MEDIA, APTITUDE LEVELS, AND TESTS

Test	*No. of Items*	*Medium*	*Aptitude*	
			High	*Low*
1	37	Regular	26.8	19.8
		TV	23.4	19.0
		Combined	25.1	19.4
2	19	Regular	10.7	8.3
		TV	9.5	7.2
		Combined	10.1	7.8
3	38	Regular	25.4	18.7
		TV	22.5	16.7
		Combined	24.0	17.7
4	23	Regular	9.4	7.3
		TV	9.1	6.6
		Combined	9.2	7.0
5	36	Regular	20.5	14.2
		TV	18.6	14.7
		Combined	19.6	14.4
6	20	Regular	12.0	10.6
		TV	11.6	9.5
		Combined	11.8	10.0
7	37	Regular	24.5	20.1
		TV	23.0	18.1
		Combined	23.8	19.1
8	23	Regular	11.7	9.8
		TV	11.0	9.1
		Combined	11.4	9.4
9	38	Regular	25.7	18.9
		TV	22.4	16.0
		Combined	24.0	17.4
10	25	Regular	18.8	16.0
		TV	16.2	13.1
		Combined	17.5	14.6
TOTAL	296	Regular	185.6	143.7
		TV	167.3	130.0
		Combined	176.5	136.8

TABLE 4.—MEAN % SCORES FOR MEDIA, APTITUDE LEVELS, AND TESTS

Test	No. of Items	Medium	Aptitude Level			Diff.
			High	Low	Combined	Reg.—TV
1	37	Regular	72.4	53.5	63.0	
		TV	63.3	51.4	57.3	5.7
		Combined	67.8	52.4	60.0	
2	19	Regular	56.3	43.7	50.0	
		TV	50.0	37.9	44.2	5.8
		Combined	53.2	41.1	47.4	
3	38	Regular	66.9	49.2	57.9	
		TV	59.2	44.0	51.6	6.3
		Combined	63.2	46.6	54.7	
4	23	Regular	40.9	31.7	36.5	
		TV	39.6	28.7	33.9	2.6
		Combined	40.0	30.4	35.2	
5	36	Regular	56.9	39.4	48.3	
		TV	51.7	40.8	46.1	2.2
		Combined	54.4	40.0	47.2	
6	20	Regular	60.0	53.0	56.5	
		TV	58.0	47.5	53.0	3.5
		Combined	59.0	50.0	55.0	
7	37	Regular	66.2	54.3	60.3	
		TV	62.2	48.9	55.7	4.6
		Combined	64.3	51.6	57.8	
8	23	Regular	50.9	42.6	47.0	
		TV	47.8	39.6	43.5	3.5
		Combined	49.6	40.9	45.2	
9	38	Regular	67.6	49.7	58.7	
		TV	59.0	42.0	50.5	8.2
		Combined	63.2	45.8	54.5	
10	25	Regular	75.2	64.0	69.6	
		TV	64.8	52.4	58.4	11.2
		Combined	70.0	58.4	64.0	
TOTAL	296	Regular	63.7	48.6	55.7	
		TV	56.5	43.9	50.2	5.5
		Combined	59.7	46.2	52.9	

ing learning and performance, and instructional medium was of lesser importance.

Retention Tests

In order to evaluate the retention test results, trainees' initial scores on the 70 items included in the retention test were used as a

base line. Table 5 presents the mean initial and retention scores on the 70 items for the Regular Classroom and Television Instruction Groups.

The results for immediate testing indicate that the Regular Instruction Group was superior to the Television Instruction Group. However, the results for retention indicate that the Television Instruction Group retained as much as the Regular Instruction Group one month later.

TABLE 5.—MEAN IMMEDIATE AND RETENTION TEST SCORES ON THE 70-ITEM RETENTION TEST

	No.	*Regular Instruction*	*TV Instruction*	*Difference*
Immediate Score				
High Aptitude	28	50.9	46.1	4.8 *
Low Aptitude	22	39.3	34.6	4.7
Combined	50	45.8	41.0	4.8 *
Retention				
High Aptitude	28	44.6	43.5	1.1
Low Aptitude	22	37.1	33.9	3.2
Combined	50	41.3	39.3	2.0

* Significant at the 5% level of confidence, two-tail test.

COMPARISON OF THE EFFECTS OF "INTENSIVE" EXPOSURE TO TV AND REGULAR CLASSROOM INSTRUCTION ON TRAINING EFFECTIVENESS

The major question to be answered in this study was whether the intensive use of television would produce a greater decline in learning than would the intensive use of classroom instruction. Table 6, column 2, indicates the percentage of differences on the 10 tests between television and classroom instruction. Evidence for a greater rate of decrease in teaching effectiveness for one of the methods would be a consistent increase in the size of the differences with each succeeding test. Column 3, Table 6, ranks the tests according to the magnitude of the differences found. This ranking provides no evidence that intensive television per se is more detrimental to learning than regular classroom instruction.

The lack of a systematic trend can be seen from Figure II, which presents the mean test scores on the 10 tests as percentages of total

possible score for regular instruction and television instruction. The shaded area represents the change in the differences between media after varying amounts of exposure time (compare with Figure I).

Because of the limited sensitivity of the experiment, it cannot be concluded that there is absolutely no difference between the two media in amount of loss in teaching effectiveness resulting from increased exposure time. It can be concluded, however, that the differences are at best relatively small, and of little importance.

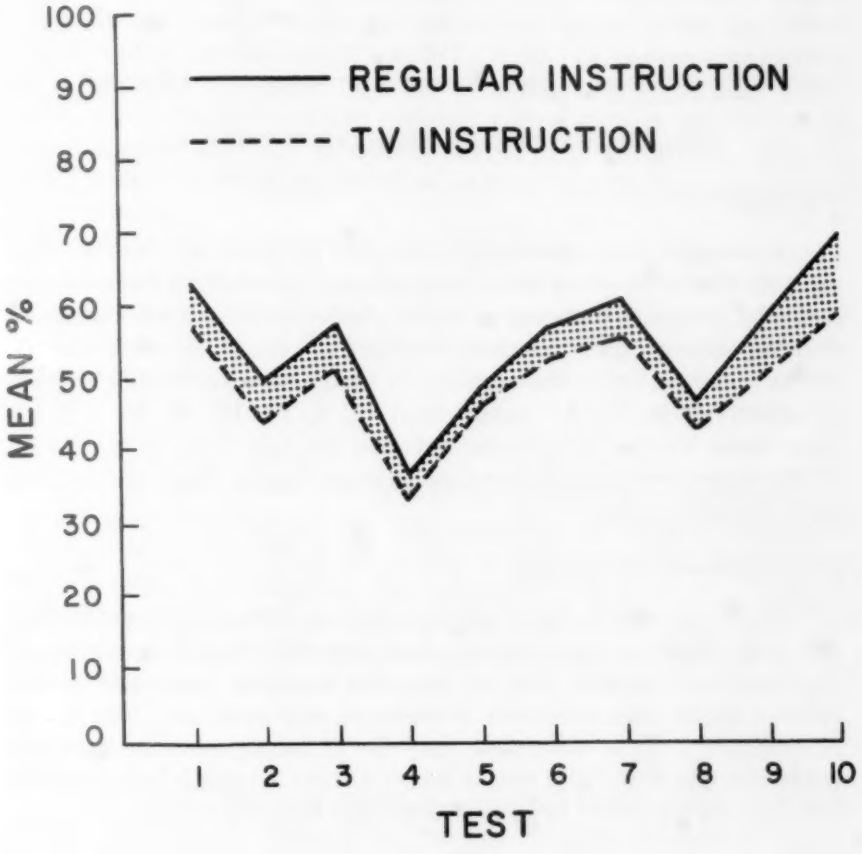

Figure II

Test by test comparisons of regular and television instruction (compare with Figure I)

TABLE 6.—PERCENTAGE DIFFERENCE AND RANK ORDER OF DIFFERENCE AS A FUNCTION OF TEST ORDER

Test Order	*Difference in %*	*Rank Order Difference*
1	5.7	6.0
2	5.8	7.0
3	6.3	8.0
4	2.6	2.0
5	2.2	1.0
6	3.5	3.5
7	4.6	5.0
8	3.5	3.5
9	8.2	9.0
10	11.2	10.0

TELEVISION VERSUS REGULAR INSTRUCTION

Training

Although this experiment was not designed to compare the over-all effectiveness of television instruction with regular instruction, the question deserves consideration. The learning results of this experiment are inconsistent with the results of other experiments which indicate that television instruction can teach at least as effectively as regular instruction (1, 2, 10, 15, 18, 19). There were some marked differences between the television presentation of this experiment and those of prior experiments. These differences shall be considered.

The Nature of the Content

Previous studies have utilized content involving a great deal of visual material, e.g., map reading, assembly and disassembly of the light machinegun, and so on. The material employed in the present study was primarily theoretical and required little visual presentation. This difference may be of importance in that TV presentations with little visual material may be much less interesting than comparable regular instruction presentations.

Scripts

The previous studies involved instruction presented from verbatim scripts; the instruction in the present study was based on

outlines. Given a good script, the first procedure insures the same coverage of the material at all times; the use of an outline does not. There is less pressure on the instructor in the classroom than there is in the TV studio. The presentation over TV requires that the instructor look into the cameras, pay attention to cues from the floorman, watch the monitor, be careful when walking and when manipulating training aids; at the same time he must present his lecture. It is possible that the coverage of the material was better and more complete in the regular instruction situation than in the TV situation.

Another factor to be considered is the pacing of the presentation. In the regular classroom situation, the students can informally control the instructor's pace by means of gestures, questions, et cetera. On television, the use of prompting equipment would also control the pace of the instructor to a certain extent. When an instructor employs an outline script in a TV presentation, he must judge for himself how slow or how fast the material should be presented.

A third factor to be considered in the use of outline scripts in TV presentations is the smoothness of the presentation. The directors, cameramen, and floormen are less certain as to the sequence of events. They must follow the instructor and thus are liable to make mistakes.

Visual Aids

The presentation suffered from inadequate employment of visual aids. The bulk of the training aids were those employed in the classroom, and while adequate for the classroom, would have been constructed differently for television. Not only were training aids different from what would normally be employed, but also, the visual advantages of TV were not exploited, e.g., use of split-screen, superimposures, or bread boards.

Instructors

The instructors had never taught by way of television prior to the experiment. They had frequently presented the instruction in the classroom prior to the experiment. The first fact means the instructors had to learn new habits of teaching. The second fact suggests the likelihood of habit interference. Thus, the instructors had to break old habits when instructing over TV and develop new

habits. These conditions would most likely reduce the effectiveness of the television instruction.

Retention

The results of this experiment are consistent with those of other studies (10, 19) indicating that material taught over TV is retained as well as material taught in the regular instruction situation. This result is important in that performance on the job will be more directly related to the retention of instruction than the learning of instruction.

The fact that there was no significant difference between methods of instruction in the retention scores of trainees reduces the importance of the initial differences in learning.

THE USE OF "MINIMAL" TELEVISION

"Minimal" television as employed is this study refers to the procedure of transmitting existing classroom instruction over television with little or no adaptation of the material to television techniques, e.g., close-ups, split-screen, superimposures, participation, and with as little or no training of instructors in television teaching requirements. As a method of television teaching, it is probably the predominant form in many areas of military and civilian instruction. From the experience and results of this study, the method has the following advantages:

1. For practical purposes, learning from minimal television approximates that obtained in the classroom. From a retention viewpoint there were no differences, one month later, between television and classroom instruction.

2. It is a relatively inexpensive method of television teaching, since it employs existing materials and instructional personnel.

3. During periods of emergency or mobilization, the rapid transition to minimal television dissemination may prove valuable in terms of time and cost savings.

The disadvantages of minimal television procedures are:

1. Teaching effectiveness is limited to that of the original classroom or other instruction upon which the television presentation is based.

2. Boredom and low motivation inherent in the original instruction may even increase over television.

3. Difficult classroom teaching problems, which such television techniques as superimposures and split-screen might solve, cannot be met by minimal television.

4. The instruction is focused upon and dominated by the instructor rather than upon critical learning aspects, and the lack of participation places the students in a passive learning role.

5. New instructors watching a minimal television presentation are dependent upon the skills which the television instructor possessed in the classroom rather than any improvements or changes brought about by adapting and using television teaching techniques.

6. When teaching over television experienced classroom instructors will miss the cues and "feedback" ordinarily provided by students. Their pacing and teaching skills probably may be disrupted.

7. From a production viewpoint, lack of scripts hinders the planning and timing of minimal television presentations by the director and other television personnel.

During emergency or mobilization periods, minimal television presentations can provide, under certain conditions, a low-cost, rapid method of instruction and information. For installations just acquiring television facilities, minimal television methods can provide immediate experience in the use of television for instruction as well as meet many pressing training problems. An example would be the training of large groups when only a few qualified instructors are available. However, this utilization phase should be gradually superseded by efforts to incorporate the advantages of television into military training. These efforts would include reorganization of instructional material so as to improve teaching effectiveness, reduce training time, and improve instructor training along the lines described in a previous report (4). Testing of television program effectiveness, use of prepared scripts, and the employment of "special effects" would be part of this more effective employment of television training. The use of prompting equipment would be important and would permit a standardization of effective television teaching not possible in minimal television presentations.

CONCLUSIONS

This study represents a pioneer attempt to present a relatively large segment of an electronics training program by television. The presentation was characterized as minimal television in that little attempt was made to translate the instruction as regularly presented in the classroom into an effective educational television presentation. On the basis of the test results, the following conclusions can be drawn.

1. Television may be employed intensively (at least for one week) without the day-to-day losses in teaching effectiveness exceeding to any great extent those normally obtained with regular instruction.

2. Minimal television presentations similar to the kind presented in this study are not as effective as regular classroom instruction in terms of immediate learning.

3. Minimal television instruction is retained as well as regular classroom instruction.

STUDY II

Background

Previous reports (4, 10) had provided certain suggestive leads as to possible applications of television which deserved further investigation. One of these was the use of television as a vehicle for achieving reductions in training time. Such reductions would be important in military training since they could be translated into monetary savings and would increase on-the-job availability of military personnel. Prior attempts to use television for achieving reductions in training time required the full-time services of professional research personnel. To reduce or eliminate this requirement, the attempt was made in this study to develop guidelines and procedures which could be employed by military personnel.

Another interest lay in studying further instructor requirements for teaching by television. In a previous report (4), there was preliminary evidence that with the aid of prompting equipment, the training of new instructors for television teaching could be rapidly achieved. Such rapid training would greatly add to the economy and value of television. The present study evaluated more extensively the findings of the previous study on rapid television instructor training.

Finally, there was an interest in developing new uses for television recordings or kinescopes. These had proved valuable, for example, as a review device (10), and had been used to supplement or replace classroom instruction. Their economy of production made kinescopes an important factor in reducing training costs. Kinescopes and films had rarely been used, however, for teaching extensive segments of instruction.

Study Objectives

The present study was concerned with evaluating and exploring the use of television to achieve the following:

1. Reduction in training time of an existing 38-hour block of conventional instruction in the Power Maintenance Course.

2. Rapid training of new television instructors.

3. The employment of television recordings (kinescopes) for more extensive segments of training.

4. Economies in preparation and use of television training aids.

5. Development of guidelines for preparing effective television presentations.

Subject Matter

A 38-hour block of electricity instruction, given in the first week of the Power Maintenance Course, was used. This instruction had been used in Study I.

Tests

Ten tests developed in the previous study were modified into six abbreviated tests. The tests were revised by further eliminating items which failed to discriminate, were too easy, or too difficult. These revisions were also necessary because of the reductions in time available in the present study for testing of the reduced television instruction. The tests were administered, one in the morning and one in the afternoon, for each of the three days of reduced television instruction. In addition, a retention test was administered about one month later. This 70-item retention test was the same employed in the previous study.

Of the 296 items employed in the previous study, 234 were selected for use in the present one. Comparisons for all groups were based only on items common to all tests.

Trainees

The trainees were enlisted men entering training in the Power Maintenance Course of the Southeastern Signal Corps School, Fort Gordon, Georgia. They were assigned to the course by normal channels employed by the school.

General Design and Study Procedures

The study was divided into three phases:

Phase I: The development and testing of a reduced television presentation to be taught by experienced instructors. These instructors had previously taught the first week of the Power Maintenance Course by conventional classroom methods. Comparisons of teaching effectiveness were based on trainee test scores achieved after either receiving reduced three-day television instruction or the conventional five-day instruction. This reduced TV instruction was repeated 4 times to 4 different groups of trainees.

Phase II: Two new instructors were trained to teach the reduced television presentation. Comparisons were made between the new and the experienced instructors giving the television instruction. This TV instruction was repeated 3 times to 3 different groups.

Phase III: The television instruction, as given by experienced instructors, was recorded on film (kinescope) and used for teaching. Comparisons were made with Phase I and II teaching results. These TV recordings were presented 3 times to 3 different groups.

Duplicated Experimental Conditions

Since this study was an extension of the one dealing with the intensive exposure to television, all of the experimental conditions, except for those noted previously, were identical. Facilities such as classrooms used, television monitors, practical exercise laboratories, administrative procedures, techniques used in the analysis of test scores, giving and scoring of tests, the means of selecting the students—all were identical.[3]

EXPERIMENTAL PROCEDURES

The Guidelines for Preparing Reduced Television Training Presentations

Teaching objectives contained in the lesson plans for the original 38 hours of instruction of the Power Maintenance Course were the framework upon which the reduced television instruction was

[3] One difference was that the first study was conducted during late winter and early spring, and the present study took place during late summer and early fall.

based. Two military script-writers used the following guidelines in preparing the television scripts:

1. An arbitrary half-hour length was established for each unit of instruction. Direct observation and suggestive leads from other television and film studies indicated that, beyond 30 minutes of instruction, distraction or fatigue increased rapidly. Another reason stemmed from the limited time conditions in the study. There was opportunity for only one attempt to achieve the desired reduction. The proposed half-hour length of instruction would cut 20 minutes from each of the original 38 hours of instruction, and would represent a goal worthy of achievement in terms of time and costs saved.[4]

2. Teaching materials were to be examined with a view to eliminating random repetition, unnecessary wordage, difficult explanations, obscure language, and similar factors. This procedure, of course, is not unique in preparing television instruction but can be applied to any method of teaching.

3. At every opportunity, the television camera's ability to combine visual and verbal information by superimposures, title cards, split-screen techniques would be employed. Picture, words, and demonstration would be interwoven to reinforce teaching points.

4. Oral and written participation would be used to reduce student passivity and boredom as well as to reinforce difficult teaching points.

5. The scripts would be *training* oriented, with major emphasis on demonstrations, diagrams, practical exercises, rather than upon the instructor. The television camera would be focused mainly upon these critical aspects of the instruction.

6. Each unit of instruction would follow the following format: review of previous or related instruction, introduction of key teaching points to be covered by the lesson, development and demonstration of these key points, a final summary and review of key points covered in the lessons.

7. Each new concept, idea, or definition would be reinforced by title cards, superimposures, and similar visual aids; difficult or "jargonistic" language would be replaced by simpler language. Mnemonic devices would be used when possible.[5]

8. Whenever possible, bulky and expensive training aids would be replaced by simpler diagrams, charts, or similar inexpensive devices, or by using actual equipment.

Constructing the Television Scripts and Presentations

Without changing the lesson plan objectives, the conventional 38 hours of instruction were organized into 38 half-hour units, and

[4] The standard length of the conventional teaching "hour" is 50 minutes.

[5] One mnemonic device used was a triangle to explain Ohm's Law. The three letters, E (Voltage), I (Current), and R (Resistance), were given various positions in the triangle to indicate required multiplication or division when using this law. As a constant reminder, this triangle was superimposed on the circuit boards during problem solving periods in the television instruction.

the script-writers assigned responsibility for a particular sequence of hours, e.g., magnetism, Ohm's Law, et cetera. Each lesson plan was studied by the script-writer and an instructor or technical advisor for accuracy and completeness. In some instances, sketchy lesson plans required research in technical journals and field manuals and complete rewriting of the lecture. Meetings were held to discuss how unsatisfactory portions of a lesson might be improved by rewriting, using visual aids, or similar methods.

This analysis led to a further reduction of the television instruction to 32 half-hour periods or 16 hours from the original 38 hours of classroom instruction.

The opening and summary sections of each half-hour of instruction were placed on the prompter. Because only 10 minutes intervened between the half-hour instruction periods, there was not sufficient time to rewind and use the prompter for each period of teaching. Therefore, the bulk of narration was read off-screen by the instructor, while any demonstrations were done by television personnel on-screen. This procedure permitted the instructor to watch the monitor, and control his speaking rate and presentation.

Preparation of Instructor and Television Personnel

To insure efficient and uniform production, the television and instruction personnel were divided into two teams. Each team consisted of a director, two floormen or assistant directors, a demonstrator, two cameramen, and one instructor. Since only one studio was available for all classes, the two teams alternated in the telecasting of each period.

The other activities of the Television Branch, a tight time schedule, and the experimental conditions themselves (trying to set up minimum requirements for instructors) kept rehearsal time to a minimum. Most of the rehearsal time was concentrated on getting the production and studio crews to operate in the synchronized fashion necessary for a split-second operation.

Approximately one hour of rehearsal time was scheduled for each hour of actual programming. This amounted to about 20 hours for each instructor. Of specific interest is the time spent with the two inexperienced instructors who had never taught a course before. In fact, they knew nothing more about electricity

than the average layman, and had never been on television before.[6]

Normally, in order to qualify as an instructor for the Power Maintenance Course, each man has to pass the 10-week course as well as the three-week instructor training program. This would amount to four months of training. In this study the inexperienced instructors spent less than one week in actual preparation.

Preparation of Visual Aids

Wherever possible, existing training aids, which had been designed to teach large-size classes and therefore were usually large and quite unwieldy for television use, were replaced by simple diagrams, cards, and most often by the actual equipment itself. Ten-penny nails were used to represent 3- to 5-foot driving rods; buckets of sand simulated acres of soil; paper clips represented magnetized metals; photographs depicted complex equipment. An actual multimeter costing $41 replaced a simulated multimeter, some 7 feet high, which had cost $125 to prepare as a visual aid.

Television Recordings

After the television instruction by the experienced instructors had been given two times, kinescoped recordings were made of their presentation. These recordings were later used to teach the trainees.

ANALYSIS OF RESULTS

Results

Comparisons are based on the tests given immediately after instruction and a 70-item retention test given about one month later. Trainees' test scores for the 38-hour conventional and "intensive" television groups are based on the number of items right, out of the 234 test questions used for these groups. In order to equate for aptitude differences among the trainees, a post-selection procedure was employed. The mean scores for the five methods of training employed are presented in Table 7.

To determine the effects of these five methods upon high- and low-aptitude personnel, 17 low-aptitude personnel (below the 40th

[6] As further evidence of their lack of knowledge about electricity, after they had taught over television for three weeks, they were given the retention test usually administered to students after completion of the course. They were not able to pass it successfully.

TABLE 7.—MEAN TEST SCORES FOR EXPERIMENTAL GROUPS

Method of Teaching	*Immediate Test Scores*	*Retention Test Scores*
38-hour conventional, 5 days	132.5	39.4
38-hour intensive TV, 5 days	114.6	37.3
16-hour reduced TV, 3 days (experienced instructors)	104.0	30.8
16-hour reduced TV, 3 days (inexperienced instructors)	100.2	31.2
16-hour reduced TV, 3 days (kinescopes)	107.0	31.4

percentile of the total sample), and 19 high-aptitude trainees (above the 60th percentile of the total sample) were selected. The test performance of these trainees under the five training methods is indicated in Table 8.

Statistical Analyses

Analyses of variance and the t-test were used to test the statistical significance of the differences among the various study conditions. The results of these analyses indicate the following:

1. The learning and retention of trainees receiving 38 hours of conventional classroom or television instruction were superior to that produced by any of the 16 hours of television training methods.

2. There was no significant difference in trainee learning from inexperienced instructors or from experienced instructors during 16 hours of television instruction.

TABLE 8.—MEAN IMMEDIATE TEST SCORES FOR HIGH- AND LOW-APTITUDE TRAINEES

Method of Teaching	*High Aptitude*	*Low Aptitude*
38-hour conventional	156.6	108.9
38-hour intensive TV	125.0	110.4
16-hour reduced TV (experienced instructors)	117.7	90.6
16-hour reduced TV (inexperienced instructors)	114.8	85.9
16-hour reduced TV (kinescopes)	122.0	92.4

3. Trainee learning from the use of 16 hours of kinescope instruction was as effective as 16 hours of "live" television with experienced or inexperienced instructors.

4. There was no significant difference in trainee retention of learning among the three types of reduced television instruction, whether by experienced instructors, inexperienced instructors, or kinescopes.

5. The immediate learning of high-aptitude trainees receiving 16 hours of television instruction was at least as effective as that of low-aptitude trainees receiving 38 hours of classroom or television instruction.

Completion of Course by Trainees in the Five Methods of Instruction

Failure to complete a course or "washback" by a trainee does not reflect the effect of small differences in teaching effectiveness, but it does provide an indication of gross differences. Information was obtained on the number of such trainee failures for the Power Maintenance Course to determine if there were any significant differences among the five methods of instruction. Table 9 presents the number of trainees from each of these five methods who were eventually dropped from the course.

TABLE 9.—NUMBER OF TRAINEES DROPPED FROM THE POWER MAINTENANCE COURSE

Method of Teaching	*Number Completing Course*	*Number Dropped*
38-hour conventional	42	5
38-hour television	38	9
16-hour television (experienced instructors)	43	4
16-hour television (inexperienced instructors)	41	6
16-hour kinescope instruction	44	3
TOTAL:	208	27

Statistical analysis indicated no significant relationship between number dropped and method of teaching.[7] It may be concluded that the differences in test scores produced by the five methods of teaching were of little consequence in terms of course completion.

[7] A chi-square test administered to this data was not significant at the 5% level of confidence (chi-square = 4.44, df = 4).

DISCUSSION OF RESULTS

Following guidelines previously described, two enlisted scriptwriters reduced the training time of a five-day period of conventional classroom instruction to three days of television instruction. This reduction represented a single attempt since there was no time to go back and improve any portion of the television instruction. While the teaching effectiveness of the three-day television instruction fell below that of the five-day instruction, there are at least three effective procedures for overcoming these differences: (a) revising and improving particular aspects of the television training as pinpointed by trainee test scores, (b) using part of the remaining two days for additional training or review, (c) additional training or review later in the course.

Interpretation of the Losses in Training Efficiency

The television instruction achieved a 43 percent reduction in training time. The loss in training efficiency was also calculated. To evaluate this loss, the following formula [8] was employed:

$$\frac{\overline{X}\ \text{Reduced TV} - \overline{X}\ \text{Control}}{\overline{X}\ \text{Control} - \frac{\text{No. of Items in Test}}{4}}$$

The results for learning were a 20 percent loss using the 38-hour television instruction for comparison, and a 39 percent loss in learning using the 38-hour classroom instruction for comparison.[9] In no case did the loss in teaching effectiveness equal the reduction in training time.

[8] This formula takes into account the effect of chance on test score by subtracting one-fourth (all items were 4-alternative multiple choice items) of the number of items in the test from the control means in the subtrahend of the formula. Because there were no differences between the means for the various reduced TV groups, the average of the three means was used. The average for retention means of the control groups (38-hour instruction groups) was employed for the same reason.

[9] The question arises as to which control condition is the appropriate base line for evaluating the effects of the reduction in training time on training efficiency, i.e., whether the 38-hour regular instruction condition or the 38-hour television instruction condition should be used as a base line. The use of the 38-hour regular instruction condition as a base line would introduce an additional variable which would confound the interpretation of the results. That is, the loss in training efficiency between the regular instruction condition and the reduced television instruction conditions would be due not only to the reduction in training time, but also to the change of medium from the regular procedure to television. A comparison of regular instruction with 38-hour television instruction, and a comparison of 38-hour television instruction with reduced television would take into account the reduction in training time. Thus, the 38-hour television condition is the appropriate base line for evaluating the effects of the reduction in training time, and the 19.6 percent loss in learning and the 34.6 percent loss in retention must be used as estimates of the effect of the treatment variables employed in this study.

Reduction in Training Time

The 43 percent reduction in training time, the major treatment variable, would be expected to have a detrimental effect upon training efficiency. There is no basis at present for deciding the expected size of the reduction in training efficiency that would result from a given reduction in training time.

Preparation of Television Instruction

The television instruction represented a drastic revision of the original 38 hours of instruction. It is likely that these revisions resulted in increased training efficiency, counteracting the losses resulting from training time reduction and other factors. While the scripts followed certain guidelines and were written with a view to improving instruction, previous experience (4) would indicate that it was unlikely these first scripts were the best possible presentations. Time precluded using the procedure of testing and revising the scripts (4). The results of this study lead to the recommendation that this procedure be employed in conjunction with the guidelines for reducing training time.

Reduction in Testing Time

Trainees receiving the 38 hours of classroom or television instruction had approximately 50 seconds to answer each item. Because of time limitations, trainees receiving the 16 hours of television and kinescope instruction had approximately 40 seconds to answer each item. This 10-second difference was probably detrimental to the test achievement of these television trainees.

Difference in Weather Conditions

The 38 hours of classroom and television instruction were taught during late winter and early spring at Fort Gordon. The reduced television instruction was given in late summer and early fall. There were radical differences in temperatures and humidity in the classrooms during these periods, reflecting the effects of mild winter and hot summer weather. Temperatures of 100°F are not uncommon at Fort Gordon during the summer, and it is likely that the classroom discomfiture of trainees receiving the 16-hour television instruction was not as conducive to learning as the

milder weather conditions experienced by the trainees receiving the 38 hours of classroom or television instruction.

Other Observations

No systematic attempt was made to observe or measure trainee reactions to the various forms of instruction used in these studies. However, visits were made to various classrooms undergoing the 38-hour and 16-hour instruction series. There were some striking differences apparent even to the cursory observer. The 38-hour instruction conditions, whether given by television or by regular instruction, were dull. Trainee distraction and boredom appeared very rapidly after instruction began. The reduced television and kinescope instruction was briskly presented, and appeared to hold trainee attention throughout. The half-hour instruction limit appeared to be a good one in terms of not exceeding trainee endurance and attention. These observations strengthened the belief that had time permitted, it would have been possible to eliminate the small day-to-day learning differences between the 38-hour and 16-hour instruction methods.

Combined Effect of the Varied Conditions

To sum up, three factors—reduction in training time, reduction in test time, and unfavorable weather conditions—would act to reduce the learning and retention scores of the reduced television groups. One factor of improvement in the television presentations would act to increase these scores. Although correct weightings cannot be given to each of the four factors, one might expect the net losses to be much greater than they actually were.

DISCUSSION OF OTHER RESULTS

Learning and Aptitude

One of the findings of this study is that high-aptitude trainees learned as well from 16 hours of instruction as did low-aptitude trainees from 38 hours of instruction. One of the implications of this finding is the desirability of using a different selection process for course assignment of trainees. From a training viewpoint, separation and training of high- and low-aptitude personnel would

lessen teaching problems. In mixed groups, the instructor who gears his teaching to abilities of the lower-aptitude personnel cannot capitalize upon the superior learning potential of the higher-aptitude personnel. Likewise, teaching at the pace at which higher-aptitude personnel can learn will generally impair and confuse learning of the lower-aptitude trainees. Where there is a wide range of aptitude present among trainees, the tasks of improving teaching effectiveness, reducing training time, and similar activities are difficult to achieve.

Rapid Training of New Instructors

Confirming the findings of a previous study (4), it was found possible to train rapidly (one week) two new television instructors in a fraction of the time (about 3-4 months) required for conventional instruction, and have them teach as effectively as experienced instructors. Again it was found that prompting equipment was invaluable in achieving this rapid training.

The Use of Television Recordings for Training

The results of this study indicate that 16 hours of training by television recordings (kinescopes) were as effective as similar "live" television instruction by experienced instructors or inexperienced instructors. These findings extend the range of usefulness of such recordings for military training purposes (9, 11, 18). It should be noted that this was the most intensive utilization of films for teaching yet reported in the field of audio-visual research (7). An important implication in this finding for Army training lies in the use of films for teaching more extensive segments of military training than is now being done. Entire courses or sections of courses can probably be converted to film teaching. Such a procedure would serve to standardize instruction within or among Army installations, achieve many cost savings, and be available for training during emergency or mobilization conditions.

Preparation of Television Presentations

One of the objectives of the present study was to determine if preparation of effective television teaching presentations was possible by nonresearch personnel. The military script-writers, following the guidelines outlined for them, showed great skill and

resourcefulness in such preparation. The testing skills which would be needed to evaluate teaching effectiveness are often available among the instructional staff of an installation, or may be part of the mission of a specific branch which generally examines the training effectiveness of various courses, such as the Testing Branch at Fort Gordon.

The Use of Television To Reduce Military Training Time

A number of questions arise in connection with the use of television to reduce training time. One of these is whether similar efforts can be made with conventional instruction without the use of television, and a corollary—whether there are any features of television which uniquely contribute to reduce training time.

The answer to the first question is Yes. Successful attempts have been made to reduce conventional teaching time without using television (3). Nor is it the contention of this study that only television can achieve reductions in training time. However, the particular role and usefulness of television becomes apparent when analyzing the steps and efforts required to reduce training time.

The reduction of training time may be broken down into two aspects—teaching techniques and administrative factors. Teaching techniques are concerned with the learning process and involve effective use of such factors as repetition, picture-word associations, and explanations. Where television is superior to classroom procedures is in its ability to manipulate, combine, and control pictorial and verbal materials.

In simpler subject matter, some approximation of this ability may be made in the classroom. Where more difficult subject matter is involved, especially with complex equipment, it is difficult to rival television's ability to effectively combine visual and verbal information. To this must be added the ability of the television camera to focus only upon what is critical for learning—a particular piece of equipment—and to bring it close-up view if necessary. The availability of such television presentation features as close-ups, split-screen, and superimposures provide the television teacher with instructional resources difficult to duplicate with classroom methods.

As pointed out in the body of this study, many things such as eliminating needless repetition or simplifying or improving lan-

guage are not unique to television. But when the requirement arises for inserting additional repetition or reinforcing a teaching point, then television possesses more features and techniques than are available in the classroom.

The second aspect, administrative factors, refers to the time and effort required to change and modify instruction when trying to achieve reductions in time. Included also are the standardization and conservation of the reduced instruction.

By whatever methods, reducing the training time of an existing block of instruction is time-consuming. One activity requiring time is instructor training. After the materials have been rewritten, it is necessary to train the instructor to present them as prepared and without change with succeeding teaching presentations. In the classroom, this is difficult. It takes time to learn a 30-minute lecture, and with succeeding presentations the factor of human variation enters so that materials and words may undergo change.

Television, in combination with a prompting device, radically reduces these problems. It is possible to make complete daily changes in instruction with little effort required to memorize or learn these changes by the instructor since he can read them from the prompter. The prompter also insures standardization of the presentation no matter how many times it is given.

To this picture must be added the fact that there is great turnover of military instructors. The usefulness of the prompter in rapidly training new instructors to an effective level has already been described in this report. It is apparent then that television can considerably reduce the effort involved in teaching time reduction and insure that such efforts are not dissipated due to instructor variation or turnover.

In summary, reduction of training time may be achieved without television. Television, however, is an effective vehicle for achieving such reductions because of its pictorial flexibility and its administrative advantages in reducing the efforts required for reducing training time.

EXPERIENCED INSTRUCTORS, INEXPERIENCED INSTRUCTORS, AND KINESCOPE RECORDINGS

The equivalence in teaching effectiveness of experienced instructors, inexperienced instructors, and kinescope recordings in-

dicates that, in television presentations of the type employed in this study, any of the three arrangements may be employed. These results have important implications for the potential use of television in Army training.

The Use of Inexperienced Instructors

The Army has difficulty in obtaining instructors for the teaching of highly technical subject matter. The usual procedure for training instructors, as previously described, reduces the instructor's productive time in service, and may also be questioned as to its effectiveness. By means of television and prompting equipment, it is possible to take a person with no knowledge of a given course's material, with none of the special skills required of a good instructor, give that person about one or two hours of rehearsal per hour of television instruction, and present this instruction to trainees with no loss in training efficiency. The results of this study are in support of this statement and are consistent with previous results (4). It is in this way that television can help in solving the problem created by the shortage of adequate instructors.

The Use of Kinescope Recordings

Once a television presentation is developed to the point where it effectively teaches a given subject matter, a kinescope recording can be made of the live presentation. Such a procedure can result in savings in time, money, and effort. The use of kinescope recordings in the present study indicates that this procedure may be used without any losses in training efficiency. It should be noted that this was the first time 16 hours of continuous film instruction had ever been attempted. The results of a previous study (10) pointed to the value of kinescopes for review training.

TELEVISION COST FACTORS

The present study was not designed to produce a thorough comparative cost analysis of television and conventional classroom instruction. This task is difficult because television is brought in as an adjunct to a training installation already organized to meet the logistics of conventional instruction. For example, existing classrooms are used as television reception sites, although, in terms

of size and viewing conditions, these sites are not always the most efficient economically, or from a teaching viewpoint, for television teaching. A new television-oriented training installation would also require somewhat different organization and administration of its various courses. For example, pursuing the findings of this study, a pool of instructors available to teach any television subject might be more adaptable to television requirements. A more complete analysis would include overhead factors such as television equipment maintenance costs, personnel costs, and numbers of students trained. These cost factors were not determined by this study.

With these cautions in mind, certain savings related to television training were apparent in carrying out the present study, and these are presented as an indication of the nature of potential savings by television training.

Savings in Training Aids

Training aids employed in regular classroom instruction were not used in the reduced television versions. Actual equipment or charts were substituted for the training aids. The costs of training aids and their substitutes are shown in Table 10.

TABLE 10.—COMPARATIVE TRAINING AND COSTS

	Regular Instruction	*Television Instruction*
Hydrometer	$ 85.00	$ 4.00
RA-21 Rectifier	436.00	5.00 (estimated)
D'Arsonval Meter Movement	264.00	5.00 (estimated)
Multimeter TV 297/U	125.00	41.00
TOTALS:	$910.00	$55.00

Any increase in the number of trainees taking the course will most likely result in an increased training aid requirement for regular instruction. For example, doubling the trainee input may increase training aid costs by as much as 100 percent. This is not the case with television instruction. Increases in trainee input would require the use of additional television monitors. In times of mobilization, when trainee input will greatly increase, large cost savings in training aids may result from the use of television.

Instructors

According to AR 35-247, the cost for a day's labor of an E-4 (pay rate scale) is $10.32. Four instructors were used to present the original five days of regular instruction and intensive television instruction. Only two instructors were used to present the three days of reduced television instruction. An increase in trainee input will most likely occasion increased instructor requirements for regular classroom instruction, but instructor requirements for television would be less. Table 11 presents instructor costs (using the E-4 pay rate) for 40 weeks of instruction with average trainee input per week being varied. In this table, it is assumed that tripling trainee input will double instructor requirements for regular instruction.

TABLE 11.—COMPARATIVE INSTRUCTOR COSTS FOR 40 WEEKS OF INSTRUCTION AS DETERMINED BY METHOD OF INSTRUCTION AND TRAINEE INPUT

Trainee Input and Instructor Costs	*5-Day Regular*	*5-Day Intensive TV*	*3-Day Reduced TV*
A. Trainee Input: 30			
Instructors	4	4	2
Total Costs *			
@ $10.32 p.d.	$ 8,256.00	$8,256.00	$2,477.00
Cost per Student	$ 6.88	$ 6.88	$ 2.06
B. Trainee Input: 90			
Instructors	8	4	2
Total Costs *			
@ $10.32 p.d.	$16,512.00	$8,256.00	$2,477.00
Cost per Student	$ 4.57	$ 2.29	$ .69
C. Trainee Input: 270			
Instructors	16	4	2
Total Costs *			
@ $10.32 p.d.	$33,024.00	$8,256.00	$2,477.00
Cost per Student	$ 3.04	$ .76	$ .23

* Instructor overhead costs are not included.

Total Cost of the Reduced Television Instruction

Cost figures were obtained for the reduced television instruction. Preparation costs, including personnel, equipment, and supplies, were $13,980. The cost of one complete presentation was

$590. The cost of 40 presentations, including preparation costs, would be $37,580, or an average of $940 a week. Exact costs for preparing the original 38 hours of the introduction to the Power Maintenance Course are not available, but they probably exceed the cost of 16 hours of television instruction. With increased trainee input, television costs will remain stable, while regular instruction costs would increase for additional instructors, training aids, et cetera.

The Cost of Kinescope Recordings

The estimated cost of the 16 hours of kinescope recordings was $1347, including the costs of raw film and developing. To this figure may be added the preparation costs of the reduced TV version of the instruction. These costs, plus the cost of a kinescope operator, result in an estimate of $16,560 as the cost of 40 weeks of the kinescope version—or an average weekly cost of $414. If the preparation costs of the live instruction upon which the kines were based are not included, the weekly cost of the kines would be about $34. Other advantages of kinescopes are:

1. The loss of effective instructors is minimized if their material is on film.

2. The instruction is standardized.

3. Other installations may use the films. This represents potential cost savings.

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AV ACTIVITIES OF STATE DEPARTMENTS IN TEACHER EDUCATION

● ROBERT E. de KIEFFER

In 1947 the author conducted a survey to determine the extent to which AV methods and techniques were being incorporated into the pre-service and in-service teacher education programs throughout the nation. A decade later an identical survey was made to determine the nature and extent of changes in these programs. This is the first in a series of articles which will compare the two status surveys. Robert E. de Kieffer is director of the Bureau of Audio-Visual Instruction, University of Colorado.

THE TASK of providing educational opportunities to the children and adults of this nation is the legal responsibility of the various states. In each state a department or section has been created which is responsible for the state-wide improvement of education through such methods as the drafting of school legislation, certification of teachers, accreditation of schools, and the administration of federal and state financial aid. In addition to the educational housekeeping functions, these departments and sections have actively fostered improved curricular methods and techniques and have devoted considerable attention to the education of teachers in the values and use of audio-visual materials.

This study was designed to determine the extent to which state departments were engaged in formulating plans for financing state-wide audio-visual programs, providing leadership, guidance, and supervision of audio-visual programs, distributing audio-visual materials, and developing certification requirements which would include training in audio-visual methods and techniques.

The importance of this study is to be found in the identification of the changing pattern of state department activities in the audio-visual field during the 10-year period from 1947 to 1957.

The percentage of questionnaire returns in 1957 was identical to that of 1947.[1] All 48 state departments (100 percent) returned the questionnaires. For comparative purposes the questionnaires were identical with the exception of a few questions relating to television.

In 1947, 11 state departments reported that they had separate audio-visual divisions within their organization. Two additional states reported that they had an "office" or "section" which carried on this activity. Twenty-seven percent of the state departments of public instruction had separate audio-visual units. A decade later, 23 or 47.8 percent of the state departments reported that separate audio-visual divisions existed within their organizations. Two states referred to their agencies as "offices" or "sections."

Formation of New Divisions

The greatest growth in the development of audio-visual divisions within state departments came after the termination of World War II. Extension divisions were established from 1945 to the present. The effectiveness with which the Armed Forces utilized instructional materials; the increased production of various types of materials, equipment, and the availability of personnel trained in the effective utilization of these materials seemed to be factors which stimulated this rapid development.

During the decade from 1947 to 1957, 10 divisions were created. Each year from 1948-1950, two additional states formalized their audio-visual divisions. No new ones were created in 1951; however, for the following two years, one new division was organized each year. Since 1953, no additional audio-visual divisions have been established.

It is difficult to rationalize why the increase in the numbers of divisions stopped at this point. However, the heavy demands of a growing school population may have so taxed the effort of the state departments not having separate audio-visual divisions, that expansion in this direction was impossible.

Personnel

A comparison of the number of people employed in audio-visual divisions from 1947 to 1957 indicates that the number of

[1] de Kieffer, Robert E. "The Status of Teacher Training in Audio-Visual Education in the Forty-Eight States." Unpublished doctor's dissertation. Iowa City: State University of Iowa, January 1948. p. 142.

full-time employees has increased from 82 to 147. The range in the number of persons employed by such divisions has increased from 0-35 in 1947 to 0-40 in 1957; however, the mean has remained constant at 6.3 persons per division.

A comparison of part-time employees indicates that 23 were employed in 1947 and 50 in 1957. The range in the number of persons employed has increased from 0-10 in 1947 to 0-18 in 1957. The mean number employed has risen from 1.7 persons in 1947 to 2.1 in 1957.

Duties and Responsibilities

In an attempt to determine the general over-all duties and responsibilities of the audio-visual divisions and to compare them on a percentage basis with the replies tabulated 10 years ago, these questions were asked:

1. Does this division formulate plans for financing a state-wide audio-visual program?

2. Does this division furnish state-wide leadership, guidance, and general supervision for audio-visual education?

3. Does this division distribute audio-visual materials?

Comparable numbers and percentages were prepared on the basis of the total number of audio-visual divisions for 1947 and 1957, and the total affirmative replies received for these three questions.

In answer to the first question: in 1947, 11 of the divisions or 85 percent said yes; in 1957, 12 of the 23 divisions or 52 percent answered affirmatively. It would appear that this particular activity of audio-visual divisions, percentage-wise, has lost ground.

In answer to the second question: in 1947 all 13 or 100 percent of the divisions replied that they furnished leadership, guidance, and general supervision to audio-visual programs; in 1957, 22 of 23 divisions or 96 percent stated that this was within their jurisdiction.

The third question dealing with distribution of audio-visual materials seems to remain about constant. In 1947, 10 of the 13 divisions or 77 percent said yes; in 1957, 18 of the 23 divisions or 78 percent answered affirmatively.

It is important to recognize that while the percentage of divisions which are distributing audio-visual materials remains ap-

proximately constant, the number of such divisions has almost doubled. This means that teachers in many states have access to new sources from which they can procure instructional materials.

Overview of State Department Activities and Plans

In comparing the number of state departments having audio-visual divisions in 1947 and 1957, data reveal that the total number has increased from 13 to 23, an increase of 21 percent.

In 1947 only six state departments averred that they contemplated the organization of an audio-visual division, yet 10 were established. In 1957, three state departments made such statements. If the percentage remains constant for the next 10 years, it is presumed that five additional states will have audio-visual divisions.

Certification Requirements

Four states, California, Florida, Minnesota, and Pennsylvania, indicated that courses in audio-visual education are required for teaching certificates. This is an increase of 100 percent over 1947, when two states made such requirements. Five additional states claimed that plans were being developed to instigate such a program.

Although New Jersey does not have a certification law concerning audio-visual education, it distributes a syllabus, *Visual Aids in Education,* which is primarily for use in the New Jersey schools and colleges of education.[2] This syllabus was written by the New Jersey State Committee for the Improvement of Visual Instruction, assisted by Dr. Leman.

In-Service Teacher Education Activities

Regardless of whether a state department has an audio-visual division, many of them are cognizant of problems which in-service teachers have in communicating ideas to students. Therefore, many of them assist these teachers with their audio-visual problems.

Six general areas were selected for comparative study as indicated by the following questions.

[2] Leman, C. W. *Visual Aids in Education.* Ann Arbor, Mich.: J. W. Edwards, Pub., 1941. p. 75.

1. Does the state department offer training in audio-visual education to in-service teachers?

2. Does the state department sponsor conferences and institutes on audio-visual education?

3. Does the state department publish materials on audio-visual education?

4. Does the state department assist individual schools in organizing in-service training programs?

5. Does the state department maintain a school visitation service to assist schools with their individual problems concerning audio-visual education?

6. Does the state department offer assistance to individual schools concerning the educational use of television?

A comparison in the number and percentage of state departments performing each of these six services directed towards in-service training of teachers indicates that in all areas, except that of sponsoring audio-visual conferences and institutes, there has been an increase over the past 10 years.

Training Offered in Audio-Visual Education to In-Service Teachers

There was only a 4 percent increase in the total number of state departments offering audio-visual education to in-service teachers between 1947 and 1957. Comparative data indicate that 15 or 31 percent of the states offered such assistance in 1947 and 17 or 35 percent offered such help in 1957.

It is presumed that the state departments have not increased this service materially because of the rapid increase in the number of teacher education institutions and extension divisions providing this type of service.

State Departments Sponsoring Audio-Visual Conferences and Institutes

Although an increasing number of teachers are receiving instruction in audio-visual methods and techniques before they graduate from teacher education institutions, there is still a large number that receive no such education. Therefore, in-service education programs become important points of contact. It is interesting to note that over the period of the past 10 years, there has been a decrease in this type of activity by state departments in the

field of audio-visual education. In 1947, 28 or 58 percent of the state departments sponsored audio-visual conferences and institutes; in 1957, only 24 or 50 percent sponsored such activities. This is the only service which decreased during this period.

There are several possible explanations for this decrease. First, more states require courses in this field for certification. Second, more institutes of higher learning require such courses for graduation. Third, the great majority of in-service teachers who, prior to 1947 were not acquainted with audio-visual methods and techniques, have now been familiarized with these tools and their application. Finally, institutions of higher learning with qualified staffs appear to be taking over this responsibility.

In comparing the length of the conferences and institutes offered from 1947-1957, the range in the average amount of time spent in 1947 was from 1.5 to 124 hours, while in 1957 the range was from 2 to 18 hours. The mean in 1947 was 24 hours, while in 1957 the mean was 6 hours. This would seem to indicate that in addition to holding fewer conferences and institutes, the time devoted to these activities has also been reduced.

The total number of persons attending such conferences and institutes has also decreased. In 1947, 27,698 people were claimed to have attended; by 1957, estimated attendance was down to 18,130. A comparison in the range of attendance changed from 25–10,000 in 1947 to 100–7500 in 1957. The mean dropped from 2130 in 1947 to 1208 in 1957.

It is presumed that although conferences and institutes conducted by state departments have decreased in importance, this technique will continue to be a service rendered by them in the foreseeable future.

Audio-Visual Materials Published by State Departments

A third way the state departments assist teachers in the area of audio-visual education is by publishing material specifically related to this field. Over a period of years, the types of published materials most commonly distributed are as follows:

1. General bulletins concerning audio-visual material.
2. Bulletins concerning specific problems of audio-visual education.

3. Lists of audio-visual materials to supplemenet state courses of study.

4. Catalogs of materials available from state departments.

The greatest shift in emphasis during the past 10 years has been in two areas. First, there was a great increase in the number of states reporting that they published general bulletins covering audio-visual education: this increase was from 8 in 1947 to 24 in 1957. Second, there was an increase in the publications of general state bulletins with sections on audio-visual education, namely: from 1 in 1947 to 9 in 1957. It is even more significant since this last item was written in by persons answering the questionnaire.

Listing of Audio-Visual Materials in State Courses of Study

One of the very helpful activities which many state departments are conducting is the listing of audio-visual materials in units of the state course of study. This activity can not be considered in the same light as can other services, because there are several states which do not publish courses of study as such. (Six states reported in 1957 that they publish no course of study.)

In 1947, 18 state departments or 38 percent reported that lists of audio-visual materials were written with units of the state courses of study. In 1957, 25 or 51 percent of state departments made such claims. These data covering a 10-year period indicate the increasing importance which state departments are placing on this type of activity.

State Department Assistance to Individual Schools

A fourth way by which state departments participate in the in-service education of teachers is by assisting individual schools with the organization of their own audio-visual in-service education program. There was a substantial increase in this service from 21 in 1947 or 44 percent of the total number of states to 33 or 69 percent in 1957. This is not surprising when it is recognized that more states currently have audio-visual divisions than in 1947. When the departments rendering such services were asked how many schools in their state were given such assistance, the comparative figures indicate that in 1947 the range was from 9 to 25 with a mean of 18 schools. In 1957 the range was from 3 to 250

with a mean of 59. These figures seem to indicate that considerable increased attention is being devoted to this area.

State Department School Visitation Service

A fifth method by which state departments assist schools with their individual audio-visual problems is through a school visitation program. Over the past 10 years there has been a 20 percent increase in this type of service. In 1947, 20 states claimed to offer school visitation service. The mean number of schools so visited was 84 with a range from 20 to 346. Ten years later, 30 states or 62 percent claimed to offer such service. The mean number of schools visited was 171 with a range of from 10–1500.

It is believed many state departments consider school visitation service the best method to provide "on the spot" assistance to individual schools in improving their audio-visual program.

Offering Assistance to Schools Concerning the Educational Use of Television

Since the last survey in 1947, educational television has received considerable attention. Although no comparable data are available, the writer felt that this type of information would be of value in this study. In answer to the question, "Does the state department offer assistance to individual schools concerning the educational use of television?" 17 state departments answered affirmatively. Of this number, 13 indicated that this assistance was considered as a service of the audio-visual division. One additional reply claimed that their audio-visual division gave such assistance indirectly. Five state departments averred that, although they currently were not offering assistance to schools in the educational use of television, plans were under way to offer such assistance in the near future.

Among the services rendered to individual schools in the area of educational use of television, the most often referred to was advisory assistance. Thirteen or 27 percent of the states claimed to offer this type of service. Assistance with plans and specifications for TV installations was offered by 9 or 19 percent. An equal number and percent (9 and 19 percent) held workshops, conferences, and institutes on the subject. Four states or 8 percent averred to distribute program ideas and programming materials,

while one, or 2 percent, stated that it provided complete educational television programs.

It is interesting to note the spectacular development in the field of television for educational purposes within the past 10 years. In 1947, TV was barely an idea. What the future development of this new medium will be is a matter for conjecture.

ERRATUM - The Editor regrets: On page 225 of the previous (Summer 1958) issue of *AVCR*, William E. Porter, associate professor of journalism at the State University of Iowa, was incorrectly referred to as William E. Parker.

CURRENT DEVELOPMENTS IN COMMUNICATION

THE NATIONAL DEFENSE EDUCATION ACT OF 1958

• KENNETH D. NORBERG

The enactment of Public Law 85-864 marks a highly significant national development with broad implications for the advancement of American education. The readers of this journal will be particularly interested in the several Titles and Sections of the Act which deal with audio-visual communication techniques and materials, or with the new media of education.

The following direct quotations contain the pertinent information. It should be noted that the various Titles of the Act are administered by different branches of the Office of Education.

TITLE III

This part of the Act provides for "financial assistance for strengthening science, mathematics, and modern foreign language instruction." Of particular interest to those involved in the use of the new media in education is Section 303 which is quoted in its entirety, as follows:

> SEC. 303. (a) Any State which desires to receive payments under this title shall submit to the Commissioner, through its State educational agency, a State plan which meets the requirements of section 1004 (a) and—
>
> (1) sets forth a program under which funds paid to the State from its allotment under section 302 (a) will be expended solely for projects approved by the State educational agency for (A) acquisition of laboratory and other special equipment, including audio-visual materials and equipment and printed

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materials (other than textbooks), suitable for use in providing education in science, mathematics, or modern foreign language, in public elementary or secondary schools, or both, and (B) minor remodeling of laboratory or other space used for such materials or equipment;

(2) sets forth principles for determining the priority of such projects in the State for assistance under this title and provides for undertaking such projects, insofar as financial resources available therefor make possible, in the order determined by the application of such principles;

(3) provides an opportunity for a hearing before the State educational agency to any applicant for a project under this title;

(4) provides for the establishment of standards on a State level for laboratory and other special equipment acquired with assistance furnished under this title;

(5) sets forth a program under which funds paid to the State from its allotment under section 302 (b) will be expended solely for (A) expansion or improvement of supervisory or related services in public elementary and secondary schools in the fields of science, mathematics, and modern foreign languages, and (B) administration of the State plan.

(b) The Commissioner shall approve any State plan and any modification thereof which complies with the provisions of subsection (a).

Obviously, a full interpretation of Section 303 requires further reading of other parts of the Act which cannot be included here because of lack of space. Local educational institutions can obtain further information on the provisions of Title III through their state agencies.

TITLE VI

This Title is headed "Language Development." Section 601 of this Title provides for the establishment and operation, in institutions of higher learning, of centers for the teaching of any modern foreign language. Section 602 on research and studies is quoted in full:

RESEARCH AND STUDIES

SEC. 602. The Commissioner is authorized, directly or by contract, to make studies and surveys to determine the need for increased or improved instruction in modern foreign languages and other fields needed to provide a full understanding of the areas,

regions, or countries in which such languages are commonly used, to conduct research on more effective methods of teaching such languages and in such other fields, and to develop specialized materials for use in such training, or in training teachers of such languages or in such fields.

Section 611, pertaining to Language Institutes, also contains specific reference to methods and instructional materials.

PART B—LANGUAGE INSTITUTES

AUTHORIZATION

SEC. 611. There are hereby authorized to be appropriated $7,250,000 for the fiscal year ending June 30, 1959, and each of the three succeeding fiscal years, to enable the Commissioner to arrange, through contracts with institutions of higher education, for the operation by them of short-term or regular session institutes for advance training, particularly in the use of new teaching methods and instructional materials, for individuals who are engaged in or preparing to engage in the teaching, or supervising or training teachers, of any modern foreign language in elementary or secondary schools. Each individual (engaged, or preparing to engage, in the teaching, or supervising or training teachers, of any modern foreign language in a public elementary or secondary school) who attends an institute operated under the provisions of this part shall be eligible (after application therefor) to receive a stipend at the rate of $75 per week for the period of his attendance at such institute, and each such individual with one or more dependents shall receive an additional stipend at the rate of $15 per week for each such dependent for the period of such attendance.

TITLE VII

This is the "audio-visual" Title of the Act. Its provisions should be examined carefully, and in detail, by every educator who is interested in developing more effective use of the new media through research and experimentation, or through dissemination of information. This part of the Act, in its entirety, reads as follows:

TITLE VII—RESEARCH AND EXPERIMENTATION IN MORE EFFECTIVE UTILIZATION OF TELEVISION, RADIO, MOTION PICTURES, AND RELATED MEDIA FOR EDUCATIONAL PURPOSES

PART A—RESEARCH AND EXPERIMENTATION

FUNCTIONS OF THE COMMISSIONER

SEC. 701. In carrying out the provisions of this part the Commissioner, in cooperation with the Advisory Committee on New

Educational Media (established by section 761), shall (through grants or contracts) conduct, assist, and foster research and experimentation in the development and evaluation of projects involving television, radio, motion pictures, and related media of communication which may prove of value to State or local educational agencies in the operation of their public elementary or secondary schools, and to institutions of higher education, including the development of new and more effective techniques and methods—

(1) for utilizing and adapting motion pictures, video tapes and other audio-visual aids, film strips, slides and other visual aids, recordings (including magnetic tapes) and other auditory aids, and radio or television program scripts for such purposes;

(2) for training teachers to utilize such media with maximum effectiveness; and

(3) for presenting academic subject matter through such media.

GRANTS-IN-AID; CONTRACTS

SEC. 702. In carrying out the provisions of section 701, the Commissioner—

(1) may make grants-in-aid, approved by the Advisory Committee on New Educational Media, to public or nonprofit private agencies, organizations, and individuals for projects of research or experimentation referred to in section 701;

(2) may enter into contracts, approved by the Advisory Committee on New Educational Media, with public or private agencies, organizations, groups, and individuals for projects of research or experimentation referred to in section 701; and

(3) shall promote the coordination of programs conducted or financed by him under this title with similar programs conducted by other agencies, institutions, foundations, organizations, or individuals.

PART B—DISSEMINATION OF INFORMATION ON NEW EDUCATIONAL MEDIA

FUNCTIONS OF THE COMMISSIONER

SEC. 731. In order to disseminate information concerning new educational media (including the results of research and experimentation conducted under part A of this title) to State or local educational agencies, for use in their public elementary or secondary schools, and to institutions of higher education, the Commissioner—

(1) shall make studies and surveys to determine the need for increased or improved utilization of television, radio, motion pictures, and related media of communication by State or local educational agencies and institutions of higher education for educational purposes;

(2) shall prepare and publish catalogs, reviews, bibliographies, abstracts, analyses of research and experimentation, and such other materials as are generally useful in the encouragement and more effective use of television, radio, motion pictures, and related media of communication for educational purposes;

(3) may, upon request, provide advice, counsel, technical assistance, and demonstrations to State or local educational agencies and institutions of higher education undertaking to utilize such media of communication to increase the quality or depth or broaden the scope of their educational programs;

(4) shall prepare and publish an annual report setting forth (A) projects carried out under this title and the cost of each such project, and (B) developments in the utilization and adaptation of media of communication for educational purposes; and

(5) may enter into contracts with public or private agencies, organizations, groups, or individuals to carry out the provisions of this part.

PART C—GENERAL PROVISIONS

ESTABLISHMENT OF THE ADVISORY COMMITTEE

SEC. 761. (a) There is hereby established in the Office of Education an Advisory Committee on New Educational Media (hereafter in this title referred to as the "Advisory Committee"). The Advisory Committee shall consist of the Commissioner, who shall be chairman, a representative of the National Science Foundation and twelve persons appointed, without regard to the civil-service laws, by the Commissioner with the approval of the Secretary. Three of such appointed members shall be individuals identified with the sciences, liberal arts, or modern foreign languages in institutions of higher education; three shall be individuals actually engaged in teaching or in the supervision of teaching in elementary or secondary schools; three shall be individuals of demonstrated ability in the utilization or adaptation of television, radio, motion pictures, and related media of communication for educational purposes; and three shall be individuals representative of the lay public who have demonstrated an interest in the problems of communication media.

(b) The Advisory Committee shall—

(1) advise, consult with, and make recommendations to the Commissioner on matters relating to the utilization or adaptation

of television, radio, motion pictures, or related media of communication for educational purposes, and on matters of basic policy arising in the administration of this title;

(2) review all applications for grants-in-aid under part A of this title for projects of research or experimentation and certify approval to the Commissioner of any such projects which it believes are appropriate for carrying out the provisions of this title; and

(3) review all proposals by the Commissioner to enter into contracts under this title and certify approval to the Commissioner of any such contracts which it believes are appropriate to carry out the provisions of this title.

(c) The Commissioner may utilize the services of any member or members of the Advisory Committee in connection with matters relating to the provisions of this title, for such periods, in addition to conference periods, as he may determine.

(d) Members of the Advisory Committee shall, while serving on business of the Advisory Committee or at the request of the Commissioner under subsection (c) of this section, receive compensation at rates fixed by the Secretary, not to exceed $50 per day, and shall also be entitled to receive an allowance for actual and necessary travel and subsistence expenses while so serving away from their places of residence.

SPECIAL PERSONNEL

SEC. 762. The Commissioner may secure from time to time and for such periods as he deems advisable, without regard to the civil-service laws, the assistance and advice of persons in the United States and from abroad who are experts in the utilization and adaptation of television, radio, motion pictures, and other related media of communication for educational purposes.

APPROPRIATIONS AUTHORIZED

SEC. 763. There are hereby authorized to be appropriated the sum of $3,000,000 for the fiscal year ending June 30, 1959, and the sum of $5,000,000 for each of the three succeeding fiscal years for carrying out the provisions of this title.

The administration of Title VII has been set up under a new branch of the Office of Education, called the New Educational Media Branch.

RESEARCH ABSTRACTS

FILM

MACCOBY, ELEANOR E.; WILSON, WILLIAM C.; and BURTON, ROGER V. "Differential Movie-Viewing Behavior of Male and Female Viewers." *Journal of Personality* 26:259-67; June 1958.

Purpose: To study the eye movements of subjects of both sexes watching motion pictures to determine whether subjects of each sex tend to watch on the screen a character of the same sex.

Procedure: The subjects were 48 college-age adults, 24 men and 24 women. Each was shown individually most of two three-reel feature films which they had not seen before. They were seated three feet from a three-foot screen so that an observer behind the screen could watch their eye movements. Each subject rested his chin on an oculist's head rest. Seven scenes in one film and eight scenes in another were selected as the test scenes. In all of these there were only two characters on the screen, the hero and the heroine. The observer timed the subjects' eye fixations on each of the characters on the screen.

Results: In both films the men tended to watch the male character on the screen for a greater proportion of the time than the women subjects did, and this was significant at the 1% level. (No statistics were reported for the similar viewing by the women subjects of the women characters on the screen, and apparently this analysis was not made.) The authors conclude that their findings are an indication that motion picture viewers tend to identify with the character of the same sex on the screen. Although the men subjects glanced at the women characters on the screen and shifted their gaze back and forth, they watched the male character's reaction even when the woman character was talking.

Factors such as composition, movement, dress, acting ability, dialogue, and camera techniques were possible sources of the sex difference found in the viewing by the subjects. The authors feel that the ability of the observer to see the sex of the subject being timed may have introduced bias into the timing. The authors suggest properly that identification of the subjects with the screen characters is only inferred from such eye movements—*Paul Wendt*

TELEVISION

McKUNE, LAWRENCE E. *Telecourses for Credit—Sept. 1, 1957.* University of the Air, Michigan State University Continuing Education Service, Michigan State University, East Lansing, Michigan. 1958. 78 p.

Purpose: To discover the scope and development of televised educational programs in the U. S.

Procedure: Listings were obtained from State Departments of Public Instruction and from a screening of publications reporting the status of televised education in the U. S. Four public school systems and eleven institutions did not submit information concerning their programs.

Results: The first television course offered for credit was in 1951. Since then 39 institutions have been presenting telecourses on a continuous basis. Twenty-two institutions that once offered courses do not offer them now. Seven have reorganized and will have courses next year. Fourteen institutions will initiate teleclasses for credit in 1957-58. Thirteen institutions have both open and closed-circuit telecourses. Twenty-two have used closed-circuit television only. Four hundred eleven courses have been offered up to fall term 1957 with an average enrollment of 121 students. Twenty-four institutions offered telecourses in which enrollment was 20 or more, while 15 had enrollments under 20. The total number of credit hours offered from 1951-57 was 988. This averaged 2.41 credit hours per course. The average number of credit hours per course during 1956-57 was 2.75.

The report lists institutions represented and addresses of personnel concerned. The title of each telecourse is given with the period when it was offered. Other information given is the number of credits, whether a certificate is issued, whether it was prepared by regular or special staff, type of compensation, type of administration, and the course fee.—*L. Twyford*

TWYFORD, L. C. *Research in Mass Communication: A Decade of Basic and Applied Science in the Navy.* Office of Naval Research, Department of the Navy, Washington, D. C. 1957. p. 153-59.

Purpose: To summarize research findings on instructional television and evaluate the factors that may lead to its more widespread use.

Procedure: Research studies conducted by the military were analyzed in terms of effectiveness, costs, practicability, class size, acceptance, and equipment configurations. Curves based upon research findings were formulated to represent how these factors interact. Optimum solutions were drawn.

Results: Television is effective with large or small groups. Inexpensive equipment can be used effectively. Acceptance of a television installation is

crucial and makes necessary the use of simple and inexpensive equipment completely under the control of the instructor. It should be made available to the greatest number of students. In addition, there should be a minimum of television programming and rehearsals. The number of cameramen and television equipment operators should be kept to a minimum. Television can be justified by increasing class size, securing better utilization of good instructors, showing small objects, and by providing a television instructor with more free time in which to improve his teaching.—*L. Twyford*

RADIO AND TELEVISION

BRODERICK, GERTRUDE G. *Directory of College Courses in Radio and Television—School Year 1957-58.* Office of Education, U.S. Department of Health, Education, and Welfare, Washington 25, D. C. 1958. 44 p.

Purpose: The purpose of this study was to obtain basic information on broadcast education being offered in colleges and universities.

Procedure: Information was solicited by questionnaire from the 1851 institutions listed in the Office of Education's Directory, Part 3, Higher Education. Returns were received from 1279 institutions, 299 of whom reported at least a minimum of one radio and/or television workshop and two courses.

Results: A comparison with the 1954-55 Directory revealed a total of 45 new institutions listed. Five institutions reported termination of their radio-television courses. Of the total 299 colleges and universities listed in the report, not more than 20 are strictly engineering or technological schools. Increased emphasis is being given to radio and television as instruments of learning. Institutions giving courses include California with 29 institutions; New York, 23 institutions; and Ohio, 19 institutions.—*L. Twyford*

BRODERICK, GERTRUDE G. *Radio and Television Bibliography.* Bulletin 1956, No. 2. Office of Education, U. S. Department of Health, Education, and Welfare, U. S. Government Printing Office, Superintendent of Documents, Washington 25, D. C. 1956. 46 p.

Purpose: To compile a bibliography of publications on radio and television prepared during the past 10 years.

Procedure: Books devoted to historical, philosophical, and sociological aspects, and those dealing with vocational training for careers in radio and television were included. Entries were classified and a brief abstract of each was prepared.

Results: The following number of entries were listed in each category: general—220; program techniques (writing, directing, producing)—112; educational uses (audio-visual, radio, and television)—62; scripts and plays—93; and technical aspects—76. A list of periodicals and sources of general information is given.—*L. Twyford*

STILL PICTURES

BOYD, NANCY A., and **MANDLER, GEORGE.** "Children's Responses to Human and Animal Stories and Pictures." *Journal of Consulting Psychology* 19:367-71; October 1955.

Purpose: To determine some reactions of third-grade children to animal and human stories and pictures.

Procedure: Ninety-six third-graders consisting of two classes of 24 in each of two nearby schools were told two stories, one with human characters, one with animals. Each was followed one time by a picture of humans, another time by a picture of animals. In all cases the children were asked to write a story about the picture. All stories had been presented by the same person, "E." The children's stories were analyzed according to eight variables of productivity and indices of ego-involvement:

1. Story Length—Number of words in story.
2. Original Ideas—Not stated or implied in story told by E.
3. Value Judgments—Expression of approbation or disapproval toward hero.
4. Punishment—Unpleasant event to hero because of his deliberate or inadvertent actions.
5. Reward—Pleasant events for the hero because of commendable behavior.
6. Occurrence of Pronoun "I."
7. New Theme—Presence or absence of divergences from main theme.
8. Formal Features—Number of words used for formal beginnings and conclusions such as title, "The End."

Results: Seventy-four percent preferred animal over human stories. However, analysis of variance and chi-square tests showed that the human stories had much greater effect on the eight variables of measuring the children's subsequent stories than the animal stories. On the other hand, the animal pictures had a greater effect than human pictures and elicited more emotional material. Most of the above mentioned variables were significantly greater when the human stories were followed by animal pictures or when animal stories were followed by human pictures.—*Paul Wendt*

LUBIN, N. M., and WILSON, M. O. "Picture Test Identification as a Function of 'Reality' (Color) and Similarity of Picture to Subject." *Journal of General Psychology* 54:31-38; January 1956.

Purpose: To determine if the degree of identification in a thematic apperception test type of picture as measured by verbal response will be increased when there is a physical similarity between the subject and the hero figure in the picture; and when the pictures are in color as contrasted with black-and-white.

Procedure: Identical sets of six achromatic and six chromatic pictures showing representations of handicapped children were used. The pictures were selected from an achromatic picture series and a chromatic picture series developed by Bachrach in collaboration with Thompson. All the pictures showed handicapped children of the same age as the experimental subjects, and to denote psychological factors that might be common to the environment of the handicapped children being tested. The pictures were reproduced on slides for presentation to the subjects in groups.

Both the control and the experimental groups consisted of 20 boys between 8 and 14 years old. The control group were normal children; the experimental group were severely physically handicapped. They were matched for verbal ability according to the short form of the California Test of Mental Maturity.

Each child was asked to write a story about each picture and the score was a numerical count of words for each story. Chi-square was used as a method of analysis and evaluated by reference to McNemar's tables. One-half of each group was shown the black-and-white pictures first, and one-half was shown the color pictures first.

Results: The verbal productivity of the handicapped children was significantly higher than that of the normal children, presumably because of better identification with the hero person in the picture. Color had opposite effects for the two groups. The handicapped scored significantly higher on the color pictures but the normal children scored significantly higher on the black-and-white pictures. The difference in favor of color pictures with the handicapped appeared only when the black-and-white pictures were presented first. When the color pictures were presented first, neither experimental nor control groups showed any significant difference between the two media.

The authors point out that previous experiments of this nature used handicapped subjects who were well adjusted to their handicap. This experiment used handicapped children who were severely handicapped or hospitalized and who could therefore be presumed to be concerned with their handicap. In other words, mere physical similarity between subjects and the figures in the TAT pictures is not enough; increased verbal production and identification comes from psychological similarities.

The authors also conclude that color adds a "reality" factor to this type of picture which will further increase identification. The authors did not mention that in connection with the Rorschach inkblot test the phenomenon of color "shock" may be a factor in personality diagnosis.—*Paul R. Wendt*

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